

AUTHOR INDEX

A

Aannestad, P. A., 36, 73, 75,
76, 100, 227
Aaranson, M., 12, 14, 17, 25,
78, 80, 149, 150, 323,
357-59, 477-85, 507
Aarseth, S. J., 168, 171, 178,
179
Abbott, D. C., 231, 283-85,
288, 290-94
Abell, G. O., 176-78
Abelson, P. H., 411
Ables, H. D., 47, 49, 62, 68,
261-63
Ables, J. G., 125
Ables, P. G., 262
Acheson, D. J., 434
Acton, C., 403
Adams, P. J., 194
Adams, W. S., 215, 222
A'Hearn, M. F., 452, 454, 455,
457, 458, 471
Aikens, R. S., 195, 201
Airey, R. W., 206
Aitken, D. K., 16, 364-66
Akhiezer, A. I., 423
Aksnes, K., 445, 470
Albers, S. C., 445
Alcaino, G., 245, 246, 253
Alexander, D. R., 521
Allamandola, L. J., 365
Allbright, G. S., 52, 62
Allen, C. W., 136, 150
Allen, D. A., 13-16, 31, 103,
367, 492, 493, 499, 500,
504
Allen, L. R., 471
Allen, R. G., 17, 541, 544
Allen, R. J., 141, 143
Aller, H., 503, 504, 506
Alpar, M. A., 439
Altenhoff, W., 345, 363, 371
Altenhoff, W. J., 355, 356, 358,
359
Ambartsumian, V. A., 167
Andereck, C. D., 153
Anderegg, M., 365
Anders, E., 409
Anderson, C., 221
Anderson, E. H., 398, 404
Anderson, J. D., 469
Anderson, P. W., 439
Andrews, P. J., 500, 504
Andriess, C. D., 36, 74, 91,
107, 351
Angel, J. R. P., 13, 36, 95, 105,
106, 203, 505
Antcliffe, G. A., 200
Antiarchos, S. K., 302
Applegate, J., 427

Armstrong, K. R., 360, 490
Arnett, W. D., 331, 336, 426,
429, 440
Arriot, F., 68
Arp, H. C., 136, 159, 246, 251,
253, 256
Arvidson, R. E., 393, 403
Arya, P. A. L., 396, 397
Askins, B. S., 64
Athay, R. G., 516, 531, 532,
534, 537
Au, C.-K., 420, 421
Auer, L. H., 68, 324
Auman, J. R., 20, 527, 528,
532, 536, 539, 540, 545
Aumann, H. H., 346
Avni, Y., 177
Avrett, E. H., 528, 532-34,
541
Axford, W. I., 280, 289
Ayres, T. R., 17, 18, 531, 536

B

Baade, W., 256, 261
Baars, J. W. M., 116, 360
Baas, F., 489, 492
Babcock, T. A., 48, 54, 58-61,
65
Bäckman, S.-O., 417
Backus, P., 452, 457
Bagri, D. C., 116
Bahcall, J., 484
Bahcall, J. N., 155, 177, 224,
416, 429, 435, 437
Bahcall, N. A., 176-78
Bailey, W. L., 527
Baird, A., 410
Baker, N. H., 319
Baker, P. L., 126
Baker, R. E., 493
Baldwin, J. A., 82, 503, 505
Baldwin, J. E., 116, 143
Baldwin, J. R., 12, 484, 486
Bale, F., 360
Balick, B., 83, 101, 143, 155,
355, 356, 358-60
Balister, M., 374
Balkowski, C., 149
Ball, J. A., 371
Ballik, E. A., 22
Baluni, V., 425
Baluteau, J. P., 365
Bappu, M. K. V., 466, 469
Barlow, B. V., 44
Barlow, M. J., 13, 31, 32, 99,
103, 227, 231, 277, 284,
293
Barnard, E. E., 445
Barnes, J., 403, 404
Barnes, J. V., 68
Barnes, T. G., 19, 23, 32, 35,
535
Barnes, T. G. III, 445
Baron, R., 452, 454, 455, 457
Barrett, A. H., 298, 370, 371,
376
Barrett, H. H., 132
Barth, C. A., 387
Bartholdi, P., 471
Basri, G. S., 194, 303, 531
Batchelor, R. A., 357, 358, 374
Bates, R. H. T., 129
Baisson, R. M., 403
Baud, B., 359, 363
Baudry, A., 374
Baum, W., 391, 395, 398, 403,
404
Baum, W. A., 262, 267, 446,
448, 453, 462, 469
BAYM, G., 415-43; 415, 417,
419-22, 425-29, 434, 439
Beals, C. S., 215
Beattie, D. H., 14
Beaver, E. A., 13, 207-9
Bechis, K. P., 16, 370
Beck, S. C., 200, 489, 492
Beckers, J. M., 544
Becklin, E. E., 11, 15, 16, 74,
78, 79, 137, 346, 348,
356-60, 362-67, 376,
478-80, 482, 484, 486, 487,
490, 492-96, 498, 500-6
Beckwith, S., 15, 16, 31, 348,
356, 358-60, 365, 371, 372,
376, 379
Bedijn, P. J., 34, 366
Beebe, R. F., 21, 24
Beer, R., 23, 29, 35
Beetz, M., 356, 360, 365
Beichman, C. A., 93, 94, 356,
360, 366
Belcher, J. W., 277
Bell, A. R., 238
Bell, R. A., 17, 25, 28, 245,
311, 312, 323, 327, 328,
330, 331, 334, 340, 514,
518, 520-22, 525, 527, 529,
530, 534, 539, 540, 542,
545
Benedict, G. F., 207, 450
Benvenuti, P., 505, 506
Bergeat, J., 12, 34, 356, 360
Bernard, A., 245, 253
Bernard, D. A., 153
Bernard, E. E., 222
Bernat, A. P., 32, 279, 296, 297
Berry, G. G., 375
Bertola, F., 152, 154
Bessell, M. S., 330
Bethé, H. A., 417, 426, 427,
430

552 AUTHOR INDEX

- Beyer, R. R., 193
 Bhandari, R., 126
 Bhattacharyya, J. C., 457, 458,
 463, 466, 469
 Biegung, J., 359
 Biemann, K., 388, 461, 464
 Bigay, J. H., 253
 Biller, J. E., 388
 Binney, J., 152, 182
 Binzel, R. P., 458
 Birch, P., 466
 Bird, G. R., 62, 63
 Birkinshaw, M., 181, 362
 Bixby, J. E., 455
 Blaauw, A., 215, 346, 347,
 363
 Black, J. H., 32, 36
 Blackadar, A. K., 397
 Blaha, M., 223
 Blair, G. N., 356, 359, 360,
 375, 379
 Blanchard, T., 97
 Blandford, R. D., 238
 Blasius, K. R., 407
 Blecker, J. A. M., 218, 221
 Bless, R. C., 75, 81, 82, 84
 Blitz, L., 346, 356, 360, 377
 Bludman, S. A., 426
 Blumsack, S. L., 397
 Bodenheimer, P., 538
 Bodmer, A. R., 422
 Boella, G., 493
 Boerio, A. H., 193
 Boesgaard, A. M., 97
 Boggess, A., 505, 506
 Bohlin, R. C., 81, 82, 86, 87,
 99, 138, 218
 Bohm, K. H., 301, 544
 Böhm-Vitense, E., 540, 541,
 545
 Bok, B. J., 252
 Boksenberg, A., 137, 152-55,
 202, 203, 499, 505, 506
 Boldt, E. A., 180
 Bologna, J. M., 358, 373
 Bond, H. E., 327
 Bond, J. R., 435
 Bonneau, D., 129
 Bonnet, R., 294
 Booth, R. S., 356, 371
 Borken, R. J., 218
 Boroson, T. A., 32
 Bosma, A., 141, 143-47, 182
 Bottinelli, L., 143
 Boulesteix, J., 203
 Bowell, E., 452, 454, 455, 457,
 458, 471
 Bowen, I. S., 56
 Bowers, F. K., 116
 Bowers, R. L., 421, 428, 429,
 432
 Bowyer, S., 181, 218, 224, 416,
 503
 Boyce, J. M., 408
 Boyce, P. B., 190
 Boyle, J., 209
 Boyle, R. J., 356, 358-60
 BRACEWELL, R. N., 113-34,
 114-17, 120-22, 124, 126
 Bræs, L. L. E., 356
 Brandt, J. C., 141, 276, 282
 Braunsfurth, E., 364
 Bray, R. J., 545
 Bregman, J. D., 11, 12, 16, 22,
 24, 366
 Brenkle, J., 390
 Briggs, G. A., 391, 392, 395,
 397, 398, 400, 403, 404,
 407, 410
 Brinkmann, R. T., 409, 446,
 457, 458, 463
 Briotta, D., 15
 Briotta, D. A., 356
 Broderick, J. J., 356, 358
 Bromage, G. E., 105
 Brooke, A. L., 19
 Brooks, N., 275, 283
 Brosche, P., 141
 Broten, N. W., 373
 Brouw, W. N., 117, 123
 Brown, D. M., 201
 Brown, F. E., 229
 Brown, G. E., 420, 427, 436-38
 Brown, R. L., 83, 218, 353,
 355-60, 362, 371, 372
 Browne, J. C., 532
 Bruhweiler, F. C., 277
 Bruzual, G., 144, 183
 Buarque, J. A., 445
 Buchholz, V. L., 197
 Buchler, J.-R., 427
 Budich, W., 86, 138
 Buff, J., 231, 235
 Buhl, D., 370
 Bunner, A. N., 218
 Burbidge, E. M., 141, 143, 144,
 152, 167, 173, 489, 492,
 503, 504
 Burbidge, G. R., 135, 141, 143,
 144, 152, 167, 489, 492,
 503
 Burgess, D. E., 202
 Burk, S. D., 407
 Burke, B. F., 345, 356, 360,
 371, 373-75
 Burke, H. K., 201
 Burke, J. R., 224
 Burke, T., 390, 406
 Burki, G., 377
 Burns, J. A., 458
 Burr, E. J., 245, 336
 Burstein, D., 87, 136, 144, 155,
 323
 Burstein, P., 218
 Burton, B., 138
 Buser, R., 520
 Businger, J. A., 396, 397
 Bussoletti, E., 365
 Buta, R., 259, 271
 Butcher, H., 204
 Butcher, H. R., 68
 Butler, D., 245, 318, 319, 328,
 330-35, 340, 341, 522
 Butler, R. C., 493
 Buxton, R. B., 370
 C
 Cacciari, C., 531
 Cain, D., 389
 Caldwell, J. A. R., 138
 Caldwell, J. J., 462
 Caldwell, L., 209
 Calvet, N., 33
 Cameron, A. G. W., 31, 74,
 183
 Cameron, R. M., 453
 Campbell, B., 95, 197
 Campbell, D., 420
 Campbell, D. K., 437
 Campbell, M. F., 356, 358,
 360, 368, 369, 378
 Campbell, P. D., 356
 Campos-Marqueti, R., 408
 Camy-Peyret, C., 23, 24
 Canavaglia, R., 68
 Canfield, R. C., 532, 544
 Cannon, C. J., 285
 Cannon, R. D., 330
 Cannon, R. E., 56, 57, 60
 Cannon, W., 410
 Cantera, R., 245-47, 258, 261,
 313, 338, 541
 Canuto, V., 418, 422, 433, 434,
 438
 Capaccioli, M., 152, 154
 Capen, C. F., 403
 Capps, R. W., 34, 78, 93, 356,
 359, 360, 364, 366, 367,
 486, 490, 497, 506, 533
 CARBON, D. F., 513-49; 17,
 18, 20, 22-24, 26, 27, 29,
 328, 332-35, 341, 522, 525,
 527-31, 537, 539, 541
 Carder, B. E. Jr., 49
 Cardiasmenos, A. G., 374
 Carlson, M., 312
 Carlson, R. W., 457, 458
 Carlston, C. E., 390, 394, 395,
 403, 404, 406, 408
 Carney, B. W., 245
 Caron, N., 365
 Carr, M. H., 403, 407
 Carrasco, L., 87
 Carrick, D. W., 183
 Carruthers, G. R., 91, 190, 222
 Carson, T. R., 434
 Carswell, R., 137, 203, 504
 Carswell, R. F., 208, 499

- Carter, D., 152
 Carter, J. C., 371
 Caah, W., 218
 Casse, J. L., 116
 CASSINELLI, J. P., 275-308;
 32, 277, 282-85, 294, 295
 Castellani, V., 321
 Castor, J., 214, 217, 230, 232,
 233
 Castor, J. I., 278, 282, 283,
 285-87, 293-95
 Caswell, J. L., 15, 349, 356-59,
 371
 Cato, B. T., 374
 Cenalmor, V., 203
 Cesarsky, D. A., 355, 357
 Chaffee, F. H., 208
 Chaffee, F. H. Jr., 205
 Chaisson, E. J., 83
 Chakkalakal, D. A., 417, 420
 Chaldur, R. S., 48
 Chandrasekhar, S., 515
 Chang, S.-H., 531
 Chang, S. W., 303
 Chanowitz, M., 423
 Chapline, G., 423, 425, 432
 Chapman, S., 390
 Charikov, A. V., 249
 Chase, S. C., 388, 410
 Chauville, J., 21, 24
 Chen, H.-H., 428
 Cheung, L., 358
 Chevalier, R. A., 153, 226, 230,
 231, 236, 249
 Chin, G., 375
 Chin, S. A., 421, 422, 425, 428,
 429
 Chincarini, G., 176, 177
 Chiosi, C., 232, 276
 Chiu, H. Y., 194, 303, 435, 531
 Chiu, L.-T. G., 183
 Chodos, A., 425
 Choisser, J. P., 207-9
 Christensen, E., 390
 Christian, R., 410
 Christiansen, W. N., 114, 116
 Christie, W. H., 243
 Chu, S. I., 233, 376
 Chudnovskii, E. M., 422, 423
 Chun, M.-S., 336
 Church, C., 390, 449, 453,
 460-62, 464-66
 Churchwell, E. B., 83
 Churms, J., 456, 467-71
 Chuvaev, K. K., 159
 Chylek, P., 88
 Ciardullo, R. B., 322
 Ciatti, F., 14
 Clark, B., 410
 Clark, B. G., 113
 Clark, J. W., 417, 420
 Clark, L. T., 56
 Clarke, G. K. C., 125
 Clavell, J., 505, 506
 Clayton, D. D., 35, 340
 Cochran, W. D., 378
 Code, A. D., 75, 81, 84, 446,
 448, 453, 462
 Cohen, J. G., 12, 17, 245, 313,
 323, 331, 336, 339, 340,
 479-81
 Cohen, M., 12-14, 31-33, 102,
 103, 231, 277, 284, 293
 Cohn, H., 216, 218, 222
 Colburn, D., 390, 394, 395,
 403, 404, 406, 408
 Colburn, J., 204
 Cole, D. J., 349
 Cole, T. W., 117
 Coleman, C., 203
 Coleman, G. D., 203
 Colgate, S. A., 204
 Colley, D., 359, 362
 Collins, J. C., 424, 425
 Collins, J. G., 17, 519, 527, 530
 Collins, L. A., 236
 Collinson, D. W., 403
 Colvin, R. S., 115, 116
 Combes, M., 456, 463
 Condal, A., 197
 Cong, H.-I., 356, 357, 364
 Connes, J., 21, 23
 Connes, P., 21, 23
 Conrath, B. J., 390, 401, 403,
 406
 Conti, P. S., 31, 231, 276, 283
 Conway, R. G., 116, 123
 Cook, A. H., 371
 Cooke, D. J., 349
 Coon, S. A., 427
 Corben, P. M., 56
 Cornwell, T. J., 126
 Corwin, H. G., 245
 Corwin, H. G. Jr., 136, 150,
 173
 Costain, C. H., 116
 Cotton, W. D., 126
 Courtes, G., 234
 Cowie, L. L., 216, 219-22,
 228-31, 234, 237
 Cowley, A. P., 245, 247, 248,
 253, 338
 Cowley, C. R., 532, 534
 Cowlik, R., 183
 Cox, D. P., 214, 223, 226, 236,
 237, 283, 294
 Cox, J. P., 538
 Coyne, G. V., 32, 92, 498-500,
 502-4, 506
 Crabtree, D. R., 499
 Crabtree, J. I., 64
 Craft, J. L., 183
 Craine, E. R., 506
 Cram, L. E., 531
 Crampton, D., 349
 Crane, P., 194, 195
 Crane, P. C., 373
 Crawford, D. L., 471
 Cromwell, R. H., 203, 205
 Cross, C. A., 410
 Cruddace, R., 218
 Cruikshank, D. P., 458
 Crutcher, R. M., 360
 Cudaback, D. D., 356, 358-60,
 371
 Culhane, J. L., 180
 Cuny, Y., 532, 541
 Curran, R., 390, 406
 Currie, D. G., 200, 209
 Cutta, J. A., 403, 407
 D
 Dackel, H. P., 277
 Da Costa, G., 336
 Da Costa, G. S., 245
 D'Addario, L. R., 115, 116,
 125, 126
 Dainty, J. C., 44, 126, 129
 Dalgarno, A., 235, 532, 535
 Dana, R. A., 365
 Daniel, G. J., 125
 Danielson, R. E., 154
 Danks, A. C., 105, 359
 Danziger, I. J., 253, 255, 261,
 324, 484, 486
 Dashen, R. F., 437
 Datta, B., 422, 427
 Dautry, F., 420
 Daviden, A., 503
 Daviden, A. F., 505
 Davidson, K., 14, 345, 378
 Davies, D. W., 408, 410
 Davies, M., 403
 Davies, R. D., 371
 Davis, J., 75, 81, 84, 223, 471
 Davis, J. H., 359
 Davis, M., 170, 195
 Davison, P. J. N., 180
 Dawe, J. A., 265
 Day, B. D., 417
 Day, K. L., 36, 79, 94, 101,
 364
 Dean, A. J., 493
 Dearborn, D. S. P., 29, 326
 de Boer, K. S., 96, 97, 99, 102,
 107, 219, 220
 de Campi, W., 359
 Deerenberg, A. J. M., 218, 221
 De Greve, J. P., 232
 de Harveng, J. M., 144
 Deharveng, L., 359
 de Jager, C., 68
 de Jong, T., 74, 233, 237, 348,
 360, 363, 365, 366, 371
 de Korte, P. A. J., 218, 221
 Delhaye, J., 246
 de Loore, C., 232
 Demarque, P., 253, 322

554 AUTHOR INDEX

- Demers, S., 26, 337
 Deming, D., 333, 341, 522
 Demoulin, M.-H., 492
 Denisjuk, E. K., 356
 Dermott, S. F., 470, 471
 Dessureau, R. L., 138
 Deupree, R. G., 324
 Deutsch, A. J., 275, 297
 de Vaucouleurs, A., 136, 150, 263
 de Vaucouleurs, G., 47, 136, 141, 143, 150, 151, 153, 167, 173, 178, 247, 259, 261, 266-68, 270, 271, 403, 452, 456, 461, 462
 Dial, A. L., 408
 Diamond, G. E., 245
 Dickel, H. R., 358, 360
 Dickel, J. R., 148, 149, 168-72, 175, 176, 181, 358, 360
 Dickens, R. J., 25, 265, 319, 327, 328, 330, 331, 334
 Dickey, J. M., 216
 Dickinson, D. F., 15, 359
 Dickinson, R. E., 401
 DiCocco, G., 493
 Dicus, D. A., 436
 Dieter, N. H., 369, 478
 Diner, D. J., 195
 Dinerstein, H. L., 366
 Dixon, K. L., 68
 Doherty, L. H., 355
 Dominy, J. F., 28
 Doms, P. E., 408
 Donn, B., 36, 364
 Dorschner, J., 34, 81
 Downes, D., 345, 355, 356, 358-60, 373-76, 378, 379
 Dragon, R., 452, 457
 Draine, B., 225, 227, 229
 Drake, F., 389
 Drake, J. F., 75, 81, 84, 86, 87, 138, 217
 Drapatz, S., 100, 108
 Dravins, D., 545
 Dressler, A., 155, 177-79
 Driffield, V. C., 47
 Dubisch, R., 393
 Duchesne, M., 190
 Duffin, G. F., 45
 Duley, W. W., 107
 Dumont, S., 518
 Duncombe, R. L., 452
 Dunham, D. W., 452, 457, 458, 469, 471
 Dunham, E., 390, 449, 452-57, 460-62, 464-67, 471
 Dunham, E. W., 460-63, 467-71
 Dupree, A. K., 299
 Durdin, J. M., 415
 Durney, B. R., 302
 Duthie, J. G., 462
 Dütsch, H. U., 459
 Duxbury, T., 403
 Dyal, P., 365
 Dyck, H. M., 14, 32, 33, 92-94, 356, 359, 360, 366, 367, 490, 497, 504, 533
 Dyson, H. B., 375
 E
 Easson, I., 433, 434
 Egan, W. G., 79
 Eggen, O. J., 251, 256, 313, 322
 Eggleton, P. P., 29
 Einasto, J., 135, 137, 138, 141, 144, 166
 Ekers, R. D., 143, 504-6
 Ekman, V. W., 396
 El Eid, M. F., 428
 Elias, J. H., 351, 357, 369, 375, 498, 502
 Eliassen, A., 398
 Elitzur, M., 233, 370
 Eljas, J. H., 15
 ELLIOT, J. L., 445-75; 390, 446, 449, 450, 452-57
 Ellis, M. J., 205
 Elmegreen, B. G., 346, 356, 357, 364, 375, 377
 Elsässer, H., 73, 74, 356, 360, 365, 367
 Elsner, R. F., 416
 Elwert, G., 132
 Emerson, D. T., 143
 Emerson, J. P., 83, 101, 358, 367
 Encrenaz, P. J., 355, 357, 360
 Endler, F., 302
 Ennis, D. J., 498, 502
 Epstein, E. E., 375, 504
 Erickson, E. F., 11, 12, 19, 22, 24, 31, 32, 35
 Eriksson, K., 28, 518, 520-22, 525, 529, 530, 534, 539, 540, 542, 545
 Eross, B., 393
 Eshleman, V. R., 389, 459
 Esipov, V. F., 257
 Etcheverry, R. D., 375
 Evans, D. S., 445, 450, 453, 460, 463
 Evans, N. J., 356, 358-60, 371, 372, 379
 Evans, P., 410
 Ewart, G. M., 433
 Ewing, M. S., 371
 F
 FABER, S. M., 135-87; 143, 153-55, 177, 178, 262, 267, 323, 337, 480, 522
 Fabian, A. C., 440
 Fabry, Ch., 448
 Fahlman, G. G., 106, 197
 Fairall, A. P., 452
 Faigaron, E., 355, 357
 Fanale, F. P., 410
 Faraggiana, R., 97
 Farless, D., 390
 Farmer, C. B., 408, 410
 Farnell, G. C., 52, 53
 Fastie, W. G., 505
 Faulkner, J., 319, 321, 324
 Fawley, W. M., 35
 Fay, T. D., 17, 22, 26
 Fay, T. D. Jr., 527
 Fazio, G. G., 357-59
 Feast, M. W., 255
 Fechner, W. B., 432
 Fechtig, H., 73, 74
 Fehsenfeld, F. C., 532
 Feitzinger, J. V., 132
 Felli, M., 284, 355, 356
 Ferguson, E. E., 532
 Ferguson, P. M., 54, 59, 60
 Ferland, G. J., 36
 Fertel, J., 24
 Festa, G. G., 436
 Fiddy, M. A., 126
 Field, G. B., 74, 97, 106, 167, 181, 235-37
 Fink, U., 15, 28, 30, 36, 365, 376
 Finn, G. D., 366
 Fireman, E. L., 218
 Fisher, J. R., 143, 148, 149, 169-71, 267, 507
 FitzGerald, M. P., 14, 85, 91, 140
 Fix, J. D., 282, 304
 Fjeldbo, G., 389, 390, 445
 Flasar, F., 390, 394, 395, 403, 404, 406, 408
 Flasar, F. M., 393, 395
 Flaud, J.-M., 23, 24
 Flowers, E. G., 428, 433, 435, 436
 Fogarty, W. G., 504
 Fomalont, E. B., 359, 490
 Forbes, F. F., 22
 Ford, H. C., 153, 155, 206, 261
 Ford, V. L., 92, 93
 FORD, W. K. JR., 189-212; 143, 144, 154
 Forman, W., 180, 181
 Forrest, W. J., 12, 15, 33, 34, 78-80, 101, 102, 364, 367, 486
 Forster, J. R., 374
 Fort, B., 203
 Fosbury, R. A. E., 203, 499
 Fossi, B. C. M., 223
 Fowler, W. A., 340
 Fox, P., 393

- Franklin, F. A., 445
 Frankston, M. J., 195
 Franz, O. G., 452, 454, 455, 457
 Frederick, E. E., 201
 Freedman, B., 425
 Freedman, D. Z., 440
 Freedman, R. A., 428
 Freeman, K. C., 141, 146, 183, 245, 252, 253, 255, 330, 335, 336, 449, 458, 461, 463, 481
 French, R. G., 390, 407, 449, 450, 459-62, 464-66
 Friedemann, C., 34, 81
 Frieden, B. R., 125
 Friman, B. L., 419, 435
 Fritz, G., 90
 Frogel, J. A., 11-13, 15, 17, 78, 80, 313, 323, 329, 336, 339, 356-60, 362, 477-86, 492
 Fröhlich, C., 388
 Fultz, D., 400
 Furenlid, I., 49, 52, 62, 303, 531
 Fusi-Pecchi, F., 321
- G**
- Gades, F., 355
 GALLAGHER, J. S., 135-87; 14, 16, 35, 36, 104, 143, 155, 182, 183
 Gammon, R. H., 33, 355
 Gardner, F. F., 375
 Garmire, G., 346, 478
 Garrison, L. M., 31, 277
 Garstang, R. H., 429
 Gascoigne, S. C. B., 245, 252, 253, 336
 Gaskell, C. M., 207
 Gatley, I., 31, 348, 356, 360, 362, 363, 493, 507
 Gaustad, J. E., 23, 33
 Gautier, T. N., 15, 28, 30, 365, 376
 Gearhart, M. R., 506
 Geballe, T. R., 22, 26, 28, 35, 365
 Gehrels, T., 92, 93, 348, 375
 Gehr, R. D., 15, 31, 32, 75, 77, 80, 84, 103, 105, 297, 356
 Geisel, S. L., 36
 Geller, M. J., 170
 Genzel, R., 356, 358-60, 373-75, 378
 Georgelin, Y. M., 349
 Georgelin, Y. P., 349
 Gerber, G. L., 183
 Gerlach, U., 432
 Gerola, H., 235, 299
 Gezari, D. Y., 129, 131, 351, 358, 369, 375, 498, 502
- Ghosh, P., 416
 Giacconi, R., 131, 181
 Giclas, H. L., 452, 454, 455, 457
 Gierasch, P. J., 390, 393, 395, 397, 403, 406, 407, 411, 449, 450, 459-62, 464-66
 Gifford, F. A., 392
 Gilbert, G., 36
 Gilbert, G. R., 203
 Gillespie, A. R., 375
 Gillett, F. C., 12, 15, 16, 23, 30, 33, 34, 78, 79, 102, 356, 358, 364, 365, 367, 486, 490, 495, 497, 504
 Gilman, R. C., 33, 34, 304
 Gilmore, W., 356, 358-60, 371, 372
 Gilmore, W. S., 353, 355, 375
 Gilra, D. P., 16, 22, 107
 Gingerich, O., 519, 522, 532, 539, 541
 Gingold, R. A., 326, 327
 Giovanelli, R., 216, 219, 221
 Giuffrida, T. S., 375
 Giuli, R. T., 538
 Glaspey, J. W., 190, 197
 Glass, I. S., 14, 32, 80, 478, 484, 490, 494, 499-501, 503, 504, 507, 542
 Glasser, M. L., 428
 Glasstone, S., 387
 Gleeson, A. M., 421, 428, 432
 Gliese, W., 137
 Glushkov, Yu. I., 356
 Goad, J. W., 144, 478-81
 Goad, L., 355
 Godwin, J. G., 179
 Goebel, J. H., 11, 12, 22, 24
 Goetze, G. W., 193
 Goguen, J. D., 453, 462
 Gold, T. G., 470, 471
 Goldreich, P., 299, 304, 373, 453, 468-71
 Goldsmith, D. W., 235, 237, 448
 Gondhalekar, P., 505, 506
 Goodenough, D. G., 253
 Goodman, J. W., 129
 Goody, R. M., 390, 395, 406
 Gordon, K., 416
 Goss, W. M., 221, 353, 355-61, 363, 371, 372, 374, 493
 Gott, J. R., 171, 179, 325
 Gott, J. R. III, 166-68, 170
 Gottlieb, C. A., 375
 Gougenheim, L., 143
 Gough, D., 537, 538
 Gough, P. T., 129
 Gould, R. J., 218, 487, 496
 Gow, C. E., 12, 204
 Graboske, H. C., 137
 Graf, W., 114, 355
- Graham, J. A., 173
 Graham, R., 229
 Grams, G. W., 88
 Grandi, S. A., 36, 203
 Grasdalen, G. L., 16, 30, 32, 35, 323, 348, 356, 359, 365, 366, 370, 478, 484, 485, 487, 492, 502-4, 507
 Gratton, R. G., 245
 Graves, E. E., 58
 Gray, D. F., 253, 521
 Grebenkemper, C. J., 115, 116
 Greeley, R., 396, 407
 Green, A. M., 418, 419
 Greenaway, A. H., 126
 Greenberg, J. M., 74, 75, 77, 97, 100, 106, 107, 365
 Greenberg, L. T., 365
 Greene, T. F., 445
 Greenstein, G., 416, 433, 439
 Greenstein, J. L., 88, 113, 137, 203, 245, 311, 312, 324
 Gregory, S. A., 166, 169, 178, 180
 Greiman, P., 390, 393, 394, 398, 400
 Greisen, E. W., 373
 Grevesse, N., 514
 Griffiths, J., 366
 Gross, P. G., 319, 321, 326, 334, 482
 Gross, W. M., 15
 Grossi, M., 390
 Grossman, A. S., 137
 Groth, E. J., 462
 Guelachvili, G., 23, 24
 Guehin, M., 143
 Guetter, H. H., 246, 312, 323
 Guinness, E., 393
 Gull, G. E., 365
 Gull, S. F., 125, 181
 Gull, T. R., 234, 505, 506
 Gundermann, E. J., 369
 Gunn, J. E., 139, 153, 174, 183, 195, 325, 478, 479, 482-84
 Gurney, R. W., 44
 Gursky, H., 131, 493
 Gürtler, J., 34, 81
 Gustafsson, B., 25, 28, 245, 514, 518, 520-22, 525, 529, 530, 532, 534, 539-42, 544, 545
 Guyer, R. A., 433, 439
- H**
- Haberle, R. M., 407, 408
 HABING, H. J., 345-85; 216, 235, 237, 277, 355, 356, 359, 360, 363, 366, 371, 372

556 AUTHOR INDEX

- Hack, M., 97
 Hackney, K. R., 504
 Hackney, R. L., 504
 Hackwell, J. A., 15, 31, 32, 75,
 77, 84, 103, 105, 356
 Hadley, G., 393
 Hagen, G. L., 245
 Hagen, W., 33, 34, 297, 298,
 305, 306
 Haisch, B. M., 299, 301, 303
 Hall, D. N. B., 14, 16, 18,
 20-24, 28-30, 35, 36, 526,
 531, 535
 Hall, N. B., 365, 367
 Halpern, J., 218
 Hamajima, K., 486
 Hamaker, J. P., 116, 126
 Hammer, R., 302
 Hammerschlag-Hensberge, G.,
 416
 Hanbury Brown, R., 75, 81, 84,
 471
 Hanel, R. A., 390, 403, 406
 Hanes, D. A., 263, 265-69
 Hansen, J. P., 427
 Hansen, S. S., 373
 Hardebeck, E. G., 359, 373
 Hardie, R. H., 471
 Harding, D., 439
 Harding, G. A., 327
 Hargrave, P. J., 489
 Hargraves, R. B., 403
 Harms, R., 207, 208
 Harper, D. A., 101, 356,
 358-60, 368, 369, 486, 490,
 495-97, 501
 Harrington, B. J., 422
 Harris, A. W., 445
 Harris, H. C., 246, 258, 261
 Harris, S., 353, 356, 359, 360,
 362
 HARRIS, W. E., 241-74; 243,
 245-49, 251, 265, 267-71,
 309, 323, 338
 Harrison, E. R., 177
 Harten, R. H., 355, 356, 359,
 362
 Hartig, G. F., 505
 Hartle, J. B., 430-32
 Hartmann, L., 32, 282, 284,
 295
 Hartmann, W., 403
 Hartoog, M., 339
 Hartoog, M. R., 25
 Hartwick, F. D. A., 139, 140,
 152-55, 245, 247, 248, 250,
 251, 253, 256, 258, 259,
 261, 270, 313, 319-21, 328,
 330, 338, 339
 Harvey, J., 197
 Harvey, J. W., 129, 132, 201
 Harvey, P., 201
 Harvey, P. J., 371
 Harvey, P. M., 14, 356, 358,
 360, 368, 369, 378, 493,
 507
 Harwit, M., 345, 365, 378
 Haschick, A., 356, 358-60, 373,
 378
 Haschick, A. D., 360, 373, 375
 Hatchett, S., 230
 Hatfield, B. F., 35
 Haugstad, B. S., 459
 Hauser, E., 452, 457
 Hauser, M. G., 351, 358, 369,
 375, 498, 502
 Hawarden, T. G., 56, 57, 60,
 500, 504
 Hawkins, R. W., 504
 Hawley, S. E., 324, 339
 Hayakawa, S., 218, 221
 Hayes, D. S., 77
 Haynes, M. P., 216, 219, 221
 Haynes, R. F., 15, 357, 358,
 371
 Hazard, C., 208, 503
 Heap, S. R., 277
 Hearn, A. G., 277, 279, 283,
 285, 294, 300-2
 Heasley, J. N., 18, 20, 26, 531,
 537
 Heckman, T. M., 375
 Heeschen, D. S., 117
 Hefele, H., 359, 367
 Hege, E. K., 205
 Hegyi, D. J., 183
 Heidmann, N., 518
 Heiles, C., 85, 87, 136, 215,
 221, 222, 238, 356, 358-60
 Helfer, H. L., 245, 311, 312,
 327
 Henden, A. A., 452, 454, 455,
 457
 Henderson, A. P., 351
 Henize, K. G., 222
 Henn, R. W., 64
 Henry, R. C., 90, 299
 Henry, R. M., 388, 389, 391,
 397-400, 404
 Henyey, L., 538
 Henyey, L. G., 88
 Herbig, G. H., 14, 104, 105,
 356
 Herbst, W., 195
 Herzog, A. D., 68
 Hess, S. L., 388, 389, 391, 395,
 397-400, 402
 Hesser, J. E., 245, 253, 313,
 328-30, 333, 335
 Heudier, J. L., 66
 Hewitt, A. V., 47, 49, 62, 68
 Hidayat, B., 457, 458
 Hide, R., 434
 Hier, R. G., 209
 Hildebrand, R. H., 486, 490,
 495-97, 501
 Hilf, E. R., 428
 Hilgemann, T., 79
 Hill, F., 35
 Hillebrandt, W., 428
 Hills, D. L., 364
 Hills, J. G., 137
 Hills, R. E., 116
 Hiltner, W. A., 205, 257,
 260
 Hines, C. O., 398
 Hinkle, K. H., 19, 20, 23, 28,
 35, 526, 535, 536
 Hinrichs, E. L., 68
 Hintz, P., 14, 137, 487, 503,
 504
 Ho, P. T. P., 358, 370, 376
 HOAG, A. A., 43-71; 48-50,
 52, 53, 189
 Hobbs, L. M., 96, 99, 219
 Hobbs, R. W., 194
 Hodge, P., 503, 504, 506
 Hodge, P. W., 253, 261, 262,
 267, 337
 Hodgman, C. D., 62
 Hoessel, J., 178
 Hoessel, J. F., 61
 Hoffman, A. A., 194
 Hoffman, W. F., 356, 358, 360,
 368, 369, 378
 Högbom, J. A., 125
 Hogg, D. E., 116, 123
 Hohl, F., 182
 Holinde, K., 419
 Holland, A. L., 408
 Hollander, M., 164
 Hollenbach, D., 233
 Hollenbach, D. J., 376, 497
 Hollweg, J. V., 276
 Holmberg, E., 141, 157, 158,
 180
 Holt, S. S., 180
 Holton, J. R., 393, 397
 Holzer, T. E., 276, 280, 281,
 289
 Honeycutt, R. K., 18, 48, 204,
 452, 454, 455, 457
 Hong, S. S., 100, 106
 Horne, K., 452, 457, 458, 471
 Horrigan, F. A., 132
 Houck, J. R., 15, 80, 101, 102,
 498, 502
 House, F., 249, 250
 Hovis, W. A., 390, 403
 Howarth, D. W., 388
 Hoxie, D. T., 137
 Hoyle, F., 79, 364, 503
 Hu, E. M., 96
 Huang, S. S., 31
 Huang, T. S., 132
 Hubbard, W. B., 456, 459-63,
 466, 471
 Hubble, E., 241, 256, 261
 Huchra, J., 149, 169, 170, 507

Huchtmeier, W. K., 143, 144, 357, 358
 Hudson, H. S., 79, 183, 369
 Huffman, D. R., 36, 74, 75, 78, 79, 83, 94, 108
 Huggins, P. J., 375, 376
 Hughes, V. A., 356
 Hummer, D. G., 287, 516, 525
 Humphreys, R. M., 13, 14, 16, 32-34
 Hundhausen, A., 276, 301
 Hundt, E., 545
 Hunt, G., 403, 404
 Hunten, D. M., 195, 453, 455, 459, 461-64
 Hunter, J., 390, 403, 404
 Hunter, J. K., 80
 Hurter, F., 47
 Hutchings, J. B., 283
 Hutchinson, R. B., 23
 Hyland, A. R., 11, 13, 15, 33, 505, 542

I

Iben, I., 303, 319, 324-27, 334, 339
 Ichimura, K., 461
 Icke, V., 234, 377, 378
 Iijima, T., 35, 486
 Illingworth, G., 152, 245, 267
 Ingersoll, A. P., 387, 410
 Ingerson, T. E., 195
 Innanen, K. A., 249, 250
 Inoue, H., 218
 Ip, W.-H., 471
 Irvine, W. M., 388
 Isherwood, B. C., 197
 Isobe, S., 88
 ISRAEL, F. P., 345-85; 277, 348, 352-56, 358-60, 362, 363, 371, 375
 Ito, K., 486
 Itoh, N., 432, 433, 435, 436, 439
 Iversen, J., 396
 Ives, J. C., 180
 Iwashima, T., 401

J

Jackson, J. C., 167
 Jackson, P. D., 140
 Jackson, R. E., 153, 154, 267
 Jacobs, V. L., 223
 Jacoby, G., 153, 155, 261
 Jaffe, D., 359
 Jaffe, R. L., 425
 Jakosky, B., 410
 Jamar, C., 75, 81-84
 James, T. H., 45, 54, 59-61, 63, 65
 Jameson, R. F., 495, 496

Janes, K. A., 47, 49, 62, 333
 Janssen, M. A., 116
 Jaschek, C. O. R., 265
 Jeffers, S., 195
 Jekowaki, J. P., 204
 Jenkins, E. B., 75, 81, 84-87, 95, 99, 215, 217, 219, 220, 222, 233, 275, 283, 284
 Jenkins, R. L., 52, 53
 Jenner, D. C., 153, 155, 164, 206, 245, 261
 Jennings, J. E., 116
 Jennings, R. E., 83, 101, 358
 Jennison, R. C., 126
 Jensen, E. B., 203, 237, 263
 Joeveer, M., 137, 138
 Johansson, L. E. B., 221
 Johns, M., 506
 Johnson, H. L., 10, 11, 22, 26, 28, 78, 80, 245, 312, 319, 478, 479, 483, 484
 Johnson, H. M., 368
 Johnson, H. R., 17, 18, 21, 24, 26, 28, 519, 521, 522, 527, 529-31
 Johnson, K., 425
 Johnson, M. B., 430
 Johnson, M. W., 90
 Johnson, S. L., 323
 Johnson, T. V., 457, 458
 Johnson, W. A., 375
 Johnston, K. J., 356, 358-60, 370-74, 378
 Jokipii, J. R., 459, 461, 463, 471
 Jones, B., 15, 16, 101, 102, 364-66
 Jones, C., 180, 181
 Jones, D. H. P., 138
 Jones, P. B., 434
 Jones, R. C., 49, 51
 Jones, T. J., 92, 497
 Jones, T. W., 16, 31, 34, 79, 102, 298, 304, 487, 496, 497, 503, 504, 506
 Jordan, C., 223
 Jordan, F. I., 64
 Joss, P. C., 416, 432, 440
 Joyce, R. R., 12, 16, 35, 365, 366, 369, 376, 486, 488, 489, 492, 499, 500, 504, 507, 533
 Jura, M., 91, 98, 227, 233

K

Kaasik, A., 135
 Kafatos, M., 224, 226, 235
 Kahn, F. D., 173, 377
 Kahn, R., 390, 394, 395, 403, 404, 406, 408
 Kaler, J. B., 48
 Kalkofen, W., 531-33, 541

Källman, C.-G., 420, 422, 423
 Kalman, G., 422
 Kalnajs, A. J., 245
 Kandel, R., 12, 34, 360
 Kandel, R. S., 378
 Kaplan, J. I., 428
 Kaplan, L. D., 23, 389
 Karachentsev, I. D., 158-60, 162, 171, 173
 Karo, D. P., 129
 Karyagina, S. V., 356
 Katem, B., 245, 319, 330
 Kato, T., 221, 224
 Kattawar, G. W., 88
 Kawara, K., 35
 Kaye, A. L., 48, 58, 65
 Kazes, I., 355, 360
 Keenan, D. W., 249, 250
 Keil, K., 410
 Keister, B. D., 425
 Kelch, W. L., 303, 531
 Kelliher, W., 410
 Kellogg, E., 181
 Kelton, P., 197
 Kemp, J. C., 495, 497-500, 502-4, 506
 Kemper, E., 328, 332-35
 Kenderdine, S., 124
 Kendziorra, E., 416
 Kephart, J. E., 452, 454, 455, 457
 Kepple, P. C., 223
 Kerr, F. J., 87, 138, 152, 154
 Kerridge, S. J., 360
 Kerstholt, J. H., 370
 Kerzhanovich, V. V., 390
 Kestenbaum, H. L., 416, 434
 Kester, D., 75, 81
 Khozov, G. V., 33
 Kieffer, H. H., 388, 392, 401, 403, 404, 406, 407, 410
 Kilston, S., 27
 King, E. S., 65
 King, I. R., 68, 138, 152, 153, 176-78, 243, 245, 246, 249, 252, 271, 478
 Kinman, T. D., 68, 245, 247, 249, 251, 257, 323, 340, 487, 503-6
 Kintner, E. C., 176-78
 Kirby, T. B., 403
 Kirillov, N. I., 47, 63
 Kirk, D. B., 390, 460, 462
 Kirshner, R., 169
 Kislinger, M. B., 425
 Kissinger, L. S., 425
 Klaasen, K., 391, 395, 398
 Klein, R. I., 282, 283, 285, 294
 Kleinmann, D. E., 36, 357-59, 484, 486, 488, 490, 492, 495, 497, 500, 504
 Kleinmann, S. G., 15, 16, 30, 365, 367

- Klemola, A. R., 450, 469
 Kliore, A. J., 389, 390, 445
 Klopfenstein, J. B., 462
 Knacke, R. F., 23, 34, 93, 497,
 499, 504, 506
 Knapp, G. R., 83, 87, 139, 143,
 152, 154, 155, 353, 356,
 358-60, 362
 Knapp, S. L., 356, 360
 Knowles, S. H., 356-59, 373-75
 Knox, K. T., 129
 Kobayashi, Y., 35
 Kodaira, K., 545, 546
 Kogan, L. R., 356, 358-60, 373,
 378
 Kolb, E. W., 436
 Kondo, Y., 279, 297
 Kong, T. Y., 409
 Koornneef, J., 82, 83
 Kopp, R. A., 304
 Korff, D., 129
 Kormendy, J., 144, 151, 153,
 183
 Kostenko, V. I., 356, 358-60,
 373, 378
 Kovalevsky, J., 456, 459, 461
 Kowal, S. T., 256, 259, 261,
 270
 Kowaliski, P., 44
 Koyama, K., 218
 Kraan, R., 170, 171
 KRAFT, R. P., 309-43; 275,
 319, 320, 328, 330, 332-35,
 340, 521, 522
 Krall, N. A., 225
 Krassner, J., 359, 360
 Krätschmer, W., 79, 94
 Kraus, J., 506
 Kraushaar, W. L., 218, 220
 Krieger, A. S., 131
 Kristian, J., 195, 200, 484
 Krive, I. V., 422, 423
 Krolík, J. H., 502, 505
 Kron, G. E., 68, 136, 245, 246,
 252, 253, 256, 257, 260,
 261, 312, 323
 Kronberg, P. P., 489
 Krupp, B. M., 17, 519, 527,
 529-31
 Ku, W., 416, 434
 Kudritzki, R. P., 297
 Kuhi, L. V., 32, 103, 277
 Kuiper, T. B. H., 356, 360,
 367, 376
 Kukarkin, B. V., 243, 245,
 246
 Kumar, S. S., 137, 519
 Kunasz, P. B., 516, 525
 Kunde, V. G., 23, 390, 403,
 406, 527, 528
 Kuppowsamy, K., 466
 Kurth, R., 249
 Kurtz, R. F., 102
 Kurucz, R., 531
 Kurucz, R. L., 21, 28, 514,
 520, 521, 526, 528, 539,
 540
 Kutner, M., 375, 376
 Kwan, J., 35, 100, 373, 376
 Kwitter, K. B., 245
 Kwok, S., 14, 277, 282, 304,
 305

L
 Labeyrie, A., 115, 128, 129,
 131
 Labeyrie, C., 68
 Labrum, N. R., 118
 Lacey, J. D., 116
 Lacy, J. H., 22, 26, 28, 489,
 492
 Lada, C. J., 346, 356-60, 364,
 371, 372, 375, 377
 LaFleur, A. L., 388
 Lallemand, A., 68
 Lamb, D. Q., 416, 427, 440
 Lamb, F. K., 415, 416, 439,
 440
 Lambert, D. L., 18-20, 23, 26,
 28, 29, 34-36, 105, 296,
 339, 514, 521, 524, 531,
 532, 535, 536
 Lamers, H. J. G. L. M., 99,
 232, 277, 285, 294
 Lampton, M., 181, 218, 416
 Lamy, P. H. L., 203
 Landaner, F. P., 200
 Landau, R., 478
 Landecker, T. L., 116
 Landini, M., 223
 Landolt, A. U., 504
 Lane-Wright, D., 197
 Langer, G. E., 328, 332-35, 341
 Langer, W. D., 229
 LaPorte, D. D., 408, 410
 Large, M. I., 415
 Larson, H. P., 15, 28, 30, 36
 Larson, R. B., 150, 247, 251,
 255, 348, 377, 478, 480,
 492
 Larson, S. M., 452, 463
 Lasker, B. M., 195, 234
 Latham, D. W., 48, 49, 51, 62,
 64, 68, 519
 Lattimer, J. M., 416, 427, 440
 Laurent, C., 216, 294
 Lea, S. M., 181
 Leach, R., 396
 Leacock, R. J., 57-59, 61, 62,
 504
 LEBOWSKY, M. J., 477-511;
 15, 16, 483, 484, 486, 490,
 491, 494, 495, 497-500,
 502-4, 506
 Lecacheux, J., 456, 463
 Leckrone, D. S., 97
 Lederberg, J., 393, 403
 Lee, B. W., 183
 Lee, J.-F., 428
 Lee, S. W., 245
 Lee, T. D., 422
 Lee, T. J., 14
 LeFebvre, J., 12, 34
 Legg, T. H., 373
 Leighton, R. B., 11, 388, 403,
 410
 Lelievre, G., 190
 Lemke, D., 359
 Lena, P. J., 102
 Lengyel-Frey, D. A., 519
 Lenzen, R., 433
 LEOVY, C. B., 387-413; 387,
 390-408
 Lequeux, J., 143
 Lerche, I., 183
 Le Squeren, A. M., 355, 360
 Lester, D. F., 16, 366
 Leung, C. M., 487, 496
 Levin, G. V., 390, 403
 Levine, A., 218
 Levinthal, E., 393, 403
 Levy, G., 389
 Lewin, P. G., 374
 Lewis, W. C., 54, 59-61, 65
 Lichten, S. M., 83
 Liebert, J., 13, 137
 Light, E. S., 154
 Lightman, A. P., 249, 440
 Liller, M. H., 245
 Liller, W., 243, 446, 449, 450,
 460-64
 Lilley, A. E., 375
 Lillie, C. F., 32, 36, 88, 91
 Limber, D. N., 151, 167, 168
 Lin, D. N., 173-75
 Lindsay, E. M., 253
 Lindzen, R. S., 390, 402
 Link, F., 456, 459, 461
 Linsky, J., 519
 Linsky, J. L., 18, 194, 299, 301,
 303, 531, 536
 Liszt, H. S., 359
 Lites, B. W., 532, 534
 Little, A. G., 114, 415
 Little, L. T., 360, 373
 Litvak, M. M., 375
 Liu, C. Y. C., 129
 Livingston, W. C., 190, 192,
 196, 197
 Lloyd-Evans, T., 255, 329, 330
 Lo, K. Y., 16, 356, 360,
 369-71, 373, 375, 498, 502
 Löbert, W., 356, 359
 Lockhart, I. A., 143, 146, 359
 Lockman, F. J., 83, 353, 362
 Lockwood, G. W., 14, 504, 533
 Lodenquai, J., 434, 438
 Loer, S. J., 367
 Loeser, R., 532-34, 541
 Loh, E. D., 200
 Lohmann, A. W., 129

- London, R., 376
 Longair, M., 166
 Longmore, A. J., 15, 495, 496
 Loren, R. B., 356, 359
 Lorre, J. J., 68
 Loughhead, R. E., 545
 Low, F. J., 32, 36, 102, 346,
 357-60, 478, 483, 484, 488,
 490-93, 495, 496, 498, 499,
 501, 503
 Lowenstein, R. F., 495, 496
 Lowman, P. D., 390, 403
 Lowrance, J. L., 194, 200, 209
 Lucas, R., 355, 357, 360
 Lucke, P. B., 85
 Lucy, L. B., 282, 286, 287, 304
 Luebke, W. R., 516, 537
 Luggner, P. M., 97
 Lum, W. T., 369
 Lund, G. I., 129, 132
 Lunel, M., 12, 34, 356, 360
 Luyten, W. J., 137
 Lynden-Bell, D., 173-75, 251,
 322
 Lynds, B. T., 85
 Lynds, C. R., 129, 132, 152-55,
 200, 201, 204, 504-6
 Lyne, A. G., 415
 Lynga, G., 252, 449, 458, 463
 Lynn, D. J., 68
 Lyutyi, V. M., 245, 257, 498
- M**
- Macchetto, F., 505, 506
 Macdonald, G. H., 116, 123,
 360
 MacGregor, K. B., 277
 Machleidt, R., 419
 Mackie, F., 427, 440
 Mader, G. L., 356, 374
 Maeder, A., 348
 Maguire, J., 390, 406
 Maihara, T., 11
 Maillard, J. P., 19, 23, 24
 Malin, M., 410
 Malina, R. F., 181, 218
 Malkan, M., 12, 17, 323,
 479-81
 Mallia, E. A., 245, 327, 328,
 330, 331, 340
 Malone, R. C., 430, 437, 438
 Mammano, A., 14
 Manassah, J. T., 437
 Manchester, R. N., 415, 439,
 440
 Manduca, A., 340, 520
 Mango, S. A., 373
 Mantz, A. W., 24
 Maran, S. P., 303, 531
 Marchant, J. C., 51, 62, 66
 Marenin, I. R., 22, 527
 Margon, B., 416, 503
 Marlbrough, J., 277, 282, 305
 Marsden, B. G., 450, 452, 457,
 469
 Martin, A. H. M., 356, 362,
 363, 369
 Martin, L. J., 403, 452, 454,
 455, 457
 Martin, P. G., 92, 94, 95, 105,
 106
 Martin, S. J., 493
 Martin, T. Z., 392, 401, 403,
 404, 406, 410
 Martynov, D. Ya., 458
 Masaki, O., 54
 Mason, K. O., 503
 Mass, C., 401, 406
 Masursky, H., 403, 407, 408
 Materne, J., 168, 170, 171
 Mathews, W. G., 155, 234,
 317, 345
 Mathewson, D. S., 92, 93, 234
 Mathieu, E. D., 171, 179
 MATHIS, J. S., 73-111; 80, 87,
 101, 106
 Mathur, N. C., 116, 123
 Matsumoto, T., 486
 Matsunami, N., 250
 Matsuoaka, M., 218
 Matsushima, S., 543
 Matthews, H. E., 353, 356,
 359, 360, 363, 371, 372
 Matthews, K., 15-17, 31, 78,
 348, 356, 359, 360, 362,
 363, 366, 378, 453, 468,
 469, 477-87, 498, 501-3,
 505
 Mattila, K., 89, 90
 Matveyenko, L. I., 356, 358-60,
 373, 378
 Maucherat, M., 359, 360
 Mavko, G. E., 77
 Maxwell, A., 355
 Maxwell, O., 430, 436-38
 Maxwell, O. V., 435
 Mayall, N. U., 245-47, 252,
 253, 256, 257, 260, 261,
 323
 Mazurek, T. J., 426, 427
 McAlary, C. W., 499
 McCammon, D., 218
 McCarthy, J. F., 15, 101, 102
 McCauley, J. F., 403, 407, 408
 McClelland, J., 183
 McClintock, J. E., 416
 McClintock, W., 299
 McClure, R. D., 68, 245, 253,
 312, 313, 320, 327, 329,
 338
 McCord, T. B., 195
 MCCRAY, R., 213-40; 214,
 217, 226, 230, 232, 233,
 235, 276, 376
 McCready, L. L., 117
 McCue, P. A., 65
 McCuskey, S. W., 138
 McDonald, L. H., 324
 McDonnell, J. A. M., 73, 74
 McElroy, M. B., 402, 409, 455,
 462
 McGrath, M., 452, 457
 McIlwain, C. E., 207
 McKee, C. F., 214, 225-31,
 233, 234, 236, 237, 502,
 505
 McLaren, R. A., 499
 McLaughlin, W., 371
 McLean, D. J., 118
 McLerran, L., 425
 McLinn, J. A., 495, 496
 McMahon, J., 452, 457, 458,
 471
 McMillan, R. S., 80
 McMullan, D., 190
 McNamara, D. H., 323
 Meaburn, J., 48, 58, 63, 349,
 362, 378
 Megill, L. R., 89
 Mehta, J., 390
 Melnick, G., 365
 Melnick, J., 178
 Meloy, D. A., 217, 233
 Mende, S. B., 202, 208
 Méndez, M. E., 10, 11, 22
 Mengel, J. G., 326, 332, 335
 Menietti, J. D., 282, 304
 Menon, T. K., 222
 Menzel, D. H., 388, 452, 456,
 461, 462
 MERRILL, K. M., 9-41; 11,
 12, 14-16, 29, 32-36, 74,
 75, 78, 79, 102, 296-98,
 304, 358, 360, 364, 486,
 490, 495, 504, 526, 535
 Mertz, L., 13, 23
 Mewe, R., 224, 301
 Mezger, P. G., 83, 100, 345,
 348, 351, 356, 371
 Michael, W. Jr., 390
 Michel, K. W., 100, 108
 Michet, D., 68
 Michon, G. J., 201
 Middleburg, F., 132
 Middleditch, J., 416
 Migdal, A. B., 420, 423
 Mihalas, D., 280, 282, 286,
 514, 516, 525, 526, 528-31,
 537-39, 545
 Milkey, R. W., 18, 20, 26, 32,
 531, 537
 Millar, T. J., 107
 Miller, H. A., 64
 Miller, J. S., 206, 317, 324, 339
 Miller, R. H., 152, 182
 Miller, W. C., 48, 54, 57-59, 65
 Millikan, A. G., 51, 55, 57, 62,
 66
 Mills, R. L., 445, 446, 452-55,
 457, 462, 466-72
 Mills, B. Y., 114

560 AUTHOR INDEX

- Milner, M. O., 129, 132
 Milton, D. J., 403
 Miner, E. D., 388, 403, 404, 410
 Mink, D., 452, 454, 455, 457, 466, 467
 Minkowski, R., 152
 Mintz, Y., 387, 390, 393, 394, 398-400
 Mintz, Y. H., 393, 394, 401
 Mitchell, R. J., 180
 Mochnaki, S., 197
 Moffat, A. F. J., 140, 349
 Moffett, T. J., 445, 503, 504
 Moiseev, I. G., 356, 358-60, 373, 378
 Moles, M., 173
 Moller, J., 263
 Monfils, A., 75, 81-84
 Moore, E. P., 204
 Moore, J., 403
 Moore, R., 276
 Moore, R. T., 217, 224, 230, 232, 233
 Moorwood, A. F. M., 358, 365
 Moos, H. W., 299
 Moran, J. M., 296, 298, 299, 356, 358-60, 369-74, 378
 Moran, S. P., 194
 Morgan, B. L., 190, 206, 469
 Morgan, D. H., 74, 89
 Morgan, T. H., 277
 Morgan, W. W., 247, 312, 323
 Mori, T. T., 375
 Moriyama, S., 401
 Morley, P. D., 425
 Morris, M., 16, 35, 356, 358, 359, 371, 489, 498
 Morrison, D., 458
 Morton, D. C., 75, 81, 84, 96, 97, 153, 194, 217, 219, 275, 277, 283-85, 294
 Moseley, H., 101
 Moseley, S. H., 486, 490, 495-97, 501
 Moszkowski, S. A., 423
 Mott, N. F., 44
 Mould, J., 12, 17, 323, 479-81, 507
 Mould, J. R., 14, 26, 149, 519, 542
 Mount, G. H., 536
 Muchmore, D. O., 301
 Mufson, S., 503, 504
 Mufson, S. L., 359
 Muhlman, D. O., 299
 Mukai, S., 12
 Mukai, T., 11, 12
 Mulholland, J. D., 452
 Mullan, D. J., 279, 300-3
 Muller, C. A., 215
 Müller, E., 428
 Münch, G., 215, 221, 388, 389, 515
 Munsuk, C., 255
 Murakami, H., 486
 Murakami, T., 221
 Murdoch, H. S., 208
 Murdock, T. L., 32
 Murray, B. C., 388, 403, 410, 411
 Murray, J. D., 349
 Murray, S., 181
 Mushotzky, R. F., 180
 Myers, P. C., 355, 375
- N
- Nachman, P., 96
 Nadeau, D., 498, 502
 Nadyozhin, D. K., 426
 Nagase, F., 221
 Nandy, K., 75, 81-84, 89
 Napier, P. J., 129
 Nası, E., 232, 276
 Nassau, J. J., 256
 Nather, R. E., 197, 450, 453, 460, 462, 463
 Natta, A., 101, 350, 365
 Nauenberg, M., 425, 432
 Neatrou, J., 427
 Negele, J. W., 417
 Nelson, B. E., 195
 Nelson, J., 416
 Nelson, R. E., 201
 Nesci, R., 245
 Netzer, H., 36
 Neugebauer, G., 11, 15, 16, 31, 78, 79, 137, 346, 348, 356-60, 362-66, 369, 375, 376, 378, 388, 453, 468, 469, 478, 480, 482, 484, 486, 487, 490, 492-96, 498, 500-6, 509
 Newell, B., 68
 Newell, E. B., 68, 263, 324
 Newton, K., 143
 Ney, E. P., 13, 33, 35, 74, 75, 80, 104, 297, 304
 Neyman, J., 135
 Nguyen-Quang-Rieu, 356
 Nguyen-Trong, T., 203
 Nicholson, P. D., 453, 468-70
 Nicholson, P. S., 360
 Nier, A. O., 402, 409, 462
 Nieto, J. L., 271
 Nieuwenhuijzen, H., 68
 Nishimura, T., 102
 Nissen, P. E., 534, 539-41, 544
 Nocar, J. L., 328, 332-35, 522
 Noerdlinger, P. D., 158
 Noguchi, K., 11, 12, 35
 Noland, M., 403
 Nordh, H. L., 521, 542
 Nordlund, A., 28, 518, 520-22, 525, 529, 530, 534, 535, 539, 540, 542-45
 Nordsieck, K. H., 87, 106, 149, 503
 Norman, C. A., 365
 Norris, J., 324, 327-30, 332, 334, 336, 522
 Northover, F. J. E., 181
 Norton, R. H., 23
 Nottale, L., 173
 Novick, R., 218, 416, 434
 Noyes, R. W., 532, 541
 Nyman, E., 419, 420, 423
- O
- O'Connell, R. W., 479
 Oda, N., 35
 O'Dell, C. R., 222
 O'Dell, S. L., 494, 500, 502-4, 506
 Oegerle, W. R., 236
 Oemler, A. Jr., 151, 177, 204
 Oemler, G., 271
 Ogden, P. M., 221, 222, 224
 O'Hara, C. E., 63
 Ohashi, T., 218
 Oke, J. B., 194, 200, 263, 478, 482, 487, 492, 493, 498, 500-6
 Okuda, H., 11, 35
 O'Leary, B., 452, 455, 457, 458, 472
 Olmon, F. M., 356
 Olofsson, S. G., 521, 542
 Olson, E. C., 333, 541
 Olson, G. L., 283, 285, 294, 295
 O'Neil, E. J., 68, 263
 O'Neill, A., 80
 Oort, J. H., 78, 138, 139, 215, 247, 249, 477
 Oosterhoff, P. T., 331
 Opal, C. B., 91, 222
 Osawa, K., 461
 Osborn, W. H., 313
 Osmer, P. S., 195, 279
 Osterburg, J. W., 63
 Ostriker, J. P., 135, 138, 182, 183, 214, 224, 231, 233, 236, 238, 249, 250, 269, 378
 Owen, F., 471, 503, 504, 506
 Owen, G. T., 461, 464
 Owen, T., 388, 409
- P
- Pacholczyk, A. G., 478, 484, 485, 494
 Pacht, E., 506
 Paczynski, B., 327

- Page, T. L., 135, 156, 157, 159, 176-78
- Pagel, B. E. J., 311, 531, 532
- Palluconi, F. D., 410
- Palm, E., 398
- Palmer, P., 16, 356, 375, 376, 489, 498
- Panagia, N., 83, 100, 101, 284, 350, 364, 365, 368
- Pandharipande, V. R., 417, 419, 421, 423, 429-31
- Pankonin, V., 83, 356
- Pannekoek, A., 446, 448
- Papaliolios, C., 462
- Pappadopoulos, G. D., 373
- Paresce, F., 218, 416
- Parker, E. A., 360
- Parker, E. N., 276, 301
- Parsons, S. B., 542
- Pawsey, J. L., 117
- Payne, H. E., 216
- Payne-Scott, R., 117
- Peach, J. V., 179
- Pearl, J. C., 390, 403, 406
- Pease, F. G., 140
- Pedigo, R. D., 421, 428, 432
- Peebles, P. J. E., 135, 166, 174, 182, 183, 267
- Peery, B. F., 19
- Peimbert, M., 83, 101, 324, 325, 488
- Pellet, A., 144
- Pelling, M. A., 370, 373
- Penhallow, W., 452, 457, 458, 471
- Penston, M. J., 494, 495, 498, 500
- Penston, M. V., 31, 80, 203, 229, 478, 479, 484, 494, 495, 498-500, 505, 506
- Pepin, T. J., 358
- Perotti, F., 493
- Perrin, J. M., 203
- Perry, M. J., 424, 425
- Perry, M. P., 64
- Persson, S. E., 11-13, 17, 25, 78, 80, 313, 323, 329, 336, 339, 356-60, 362, 365, 376, 453, 468, 469, 477-86
- Peterfreund, A. R., 392, 403, 404, 407, 410
- Peters, W. L., 173, 360, 375, 379
- Peterson, C. J., 152, 154, 157, 243, 246, 249, 250
- Peterson, R., 521
- Peterson, S., 149, 157, 159, 160, 169
- PTHICK, C., 415-43; 415-17, 419, 421, 426-29, 433, 434, 439
- Petrie, P. L., 265, 267, 269-71
- Petrosian, V., 365
- Peytreman, E., 514, 525, 528, 530
- Philip, A. G. D., 324
- Phillips, T. G., 375, 376
- Pickering, W. H., 222
- Picklum, R. E., 440
- Pidek, D., 390, 394, 395, 403, 404, 406, 408
- Pieri, D., 393, 408
- Piersma, T. R., 91
- Pietsch, W., 416
- Pikel'ner, S. B., 229
- Pikoos, C., 388
- Pilachowski, C. A., 17, 25, 339
- Pines, D., 416, 419, 431, 439, 440
- Pinnick R. G., 88
- Pipher, J. L., 9, 15, 102, 356, 359, 360, 364, 477
- Pirraglia, J. A., 390, 398, 406, 407
- Platt, J. R., 92
- Pneumann, G. W., 304
- Pollack, J. B., 390, 392-98, 400, 401, 403, 404, 406-11
- Pomphrey, R. B., 504
- Ponsonby, J. E. B., 125, 126
- Pooley, G., 503
- Porcas, R. W., 503, 504
- Poteet, W. M., 102
- Pottasch, S. R., 219
- Potter, A. E., 32
- Poulakos, C., 356, 360, 365
- Poveda, A., 151
- Prabhakara, C., 390, 403
- Praderie, F., 97, 531
- Preite-Martinez, A., 350
- Prendergast, K. H., 141, 143, 144
- Preston, G. W., 318
- Price, K. M., 115, 116
- Price, S. D., 11, 15, 24, 353, 508, 527
- Pringle, J. E., 440
- Pritchett, C., 324, 522
- Prociuk, I., 263
- Pronik, V. I., 159
- Puettner, R. C., 11, 14, 15, 35, 101, 102, 359, 502, 505
- Puget, J. L., 102
- Purcell, E. M., 36, 73, 75, 76, 100, 105
- Purton, C. R., 14
- Puschell, J. J., 494, 500, 503, 504, 506
- Quam, L., 393
- Querci, F., 22, 28, 517, 520, 523, 525, 527, 528, 530, 531
- Querci, M., 22, 28, 517, 520, 523, 525, 527, 528, 530
- Quirk, R. F., 63
- R
- RACINE, R., 241-74; 245, 249, 254, 257, 261, 263, 267, 323
- Radick, R., 452, 454, 455, 457
- Radick, R. R., 77
- Rages, K., 461, 471, 472
- Raimond, E., 215
- Ramsden, D., 493
- Ramsey, D. A., 22
- Ramsey, L. W., 18, 20, 533
- Rank, D. M., 16, 22, 26, 28, 35, 366
- Rappaport, S., 218, 231, 416
- Rappaport, S. A., 201
- Ravenhall, D. G., 416, 427, 440
- Raymond, J. C., 223, 224, 226, 227
- Read, R. B., 373
- Readhead, A. C. S., 126
- Reber, G., 114
- Reddish, V. C., 56
- Reed, M. A., 16, 31
- Reed, R. A., 80
- Rees, M. J., 440
- Reid, M. J., 299, 371, 372
- Reifenstein, E. C., 345, 371
- Reimers, D., 33, 276, 279, 296-300, 303, 306
- Reitsema, H., 452, 454, 455, 457
- Relyea, L. J., 520, 540, 541
- Renda, G., 200
- Renzini, A., 319, 321, 322, 325, 329, 333, 531
- Reppin, C., 416
- Resnick, M., 104
- Rex, K. H., 77
- Reynolds, R. J., 221, 222, 234
- Rho, M., 423
- Rice, W., 478-81
- Richardson, W. W., 54-56, 58, 59, 65
- Richstone, D., 182
- Rickard, L. J., 376, 489, 498
- Ride, S. K., 218
- RIDGWAY, S. T., 9-41; 14, 16, 18, 20, 22-26, 28-30, 36, 365, 367, 526, 531, 533, 535
- RIEKE, G. H., 477-511; 15, 16, 360, 478, 483, 484, 486, 487, 490-506
- Ries, L. M., 26, 339, 521, 524
- Righini, G., 369
- Righini-Cohen, G., 351
- Riley, P. W., 373

562 AUTHOR INDEX

- Rinehart, R., 355
 Ring, J., 206
 Rinsland, C. P., 12
 Ristig, M. L., 417
 Roach, F. E., 89
 Roberts, M. S., 141, 143, 144, 147, 149, 150
 Roberts, P. H., 302
 Roberts, W. W., 237
 Robinson, G., 33
 Robinson, J., 403
 Robinson, L. B., 206, 207, 323
 Robkoff, H., 452, 457
 Rodgers, A. W., 205, 245, 318, 330, 340
 Rodriguez, L. F., 83
 Rodriguez-Kuiper, E. N., 367, 376
 Roeder, R. C., 504
 Roger, R. S., 116, 349
 Rogers, A. E. E., 371
 Rögerson, J. B., 75, 81, 84, 217, 277, 294
 Rogstad, D. H., 143, 146
 Rohlfis, K., 364
 Romanishin, W., 478-81
 Rönnäng, B. O., 356, 358-60, 373, 374, 378
 Rood, H. J., 148, 149, 168-72, 175-78, 181
 Rood, R. T., 176, 177, 321, 324, 330
 Rose, A., 51
 Rose, H., 410
 Rose, J., 155
 Rose, J. A., 173
 Rose, L. A., 36
 Rosner, R., 301, 302
 Rothman, V. C., 176
 Rots, A. H., 143
 Rouan, D., 102
 Rousseau, J., 245
 Routly, P. M., 98, 219
 Roux, S., 349
 Rowan-Robinson, M., 353
 Roy, J. R., 282, 305
 Rubin, R. H., 351, 358
 Rubin, V. C., 143, 144, 154, 489
 Ruderman, M. A., 416, 428, 434, 436, 438-40
 Rudnick, L., 503, 504, 506
 Rummel, U., 141
 Rumpl, W., 87, 106
 Rumpl, W. M., 277
 Rushneck, D. R., 388
 Russell, R. W., 11, 12, 14-16, 35, 36, 78, 79, 101, 102, 359, 486, 488-90
 Rutily, B., 245
 Ryan, J. A., 388, 391, 397-400, 402, 404
 Rybicki, G. B., 287
 Rybski, P. M., 207
 Rydbeck, O. E. H., 356, 358-60, 373, 374, 378
 Rydgren, A. E., 31
 Ryle, M., 114, 116, 345
 Ryter, C. E., 102
 S
 Saar, E., 135
 Sabbadini, A. G., 432
 Sagan, C., 390, 393, 401, 403, 406, 446, 449, 460-66
 Salpeter, E. E., 29, 74, 95, 98, 106, 107, 144, 146, 216, 225, 227, 229, 230, 304, 435
 Sancisi, R., 143, 146, 221
 Sandage, A. R., 136, 140, 143, 167, 169, 173-75, 195, 245, 251, 262, 263, 267, 312, 319, 321, 322, 324, 330, 481, 482, 486, 496
 Sander, W., 446
 Sanders, R. H., 358
 Sanders, W. T., 218
 Sandford, M. T., 204
 Sanford, P. W., 503
 Sanford, R. F., 215
 Sanner, F., 104, 279, 296, 297
 Sarazin, C., 348, 356
 Sarazin, C. L., 83, 155, 224, 364, 429
 Sargent, A., 346-48, 360, 375
 Sargent, D. G., 15
 Sargent, W. L. W., 139, 140, 152-55, 167, 173, 203, 245, 247, 248, 250, 251, 256, 258, 259, 261, 270, 279, 324, 325, 338, 478, 484, 499, 503
 Saslaw, W. C., 167, 168, 249
 Sato, K., 426
 Sato, S., 11, 35
 Sauls, J. A., 420
 Sauval, A. J., 514
 Savage, A., 203
 SAVAGE, B. D., 73-111; 32, 75, 81, 82, 86, 87, 99, 104, 105, 138, 218, 220
 Savedoff, M. P., 359, 360
 Sawyer, H. B., 243
 Sawyer, R. F., 430, 431, 439
 Sawyer Hogg, H. B., 246
 Scalapino, D. J., 430, 431
 Scalo, J. M., 27, 479, 523, 524
 Scargle, J. D., 32
 Schaber, G. G., 408
 Schalén, C., 77
 Schechter, P., 153, 178
 Schechter, P. L., 153
 Schiffer, F. H., 80
 Schild, R. E., 77
 Schlachman, B., 390, 403
 Schmeltekopf, A. L., 532
 Schmid-Burgk, J., 545
 Schmidt, E. G., 105
 Schmidt, G. D., 13, 209
 Schmidt, G. W., 207, 209
 Schmidt, M., 140, 141, 194, 249-51
 Schmitz, F., 18, 531
 Schneiderman, A. M., 129
 Schneps, M. H., 370
 Schnopper, H. W., 22
 Scholz, M., 545
 Schommer, R. A., 245, 247, 248, 313, 338
 Schrader, H. W., 54-56, 58, 59, 65
 Schraml, J., 83, 345, 351, 371
 Schramm, D. N., 183, 325, 326, 436, 440
 Schulman, S. D., 90
 Schulte in den Bäumen, J., 359
 Schultz, G. V., 75-77, 84
 Schupler, B. R., 32
 Schurmann, S., 360
 Schuster, H. E., 243
 Schwartz, D. A., 493
 Schwartz, P. R., 370, 375
 Schwarz, U. J., 358
 Schwarzschild, M., 19, 154, 176, 535
 Schweizer, F., 143, 146, 258
 Scott, E., 135
 Scott, J. S., 237
 Scott, P. F., 356, 359, 362
 Scott, R. L., 57-59, 61, 62, 504
 Scoville, N., 299, 304
 Scoville, N. Z., 100
 Seagar, A. D., 129, 132
 Searle, L., 245, 247, 256-59, 263, 309, 317, 330, 337, 339, 492, 493, 498, 500
 Seaton, M. J., 96, 97
 Sedov, L., 230
 Seeger, P. A., 340
 Segalowitz, A., 143
 Seidel, B. L., 390, 445
 Seidelmann, P. K., 452
 Seielstad, G. A., 143
 Seiff, A., 390, 460, 462
 Seitzer, P., 169
 Seligren, K., 11, 35, 359
 Selmes, R. A., 494, 495, 498, 500
 Serene, J. W., 420
 Serkowski, K., 92, 93, 504
 Serlemitsos, P. J., 180
 Serra, G., 102
 Sewell, M. H., 48, 57, 59-61
 Seyfert, C. K., 256
 Shaham, J., 416, 439, 440
 Shakeshaft, J. R., 116
 Shane, C. D., 85
 Shane, W. W., 143
 Shanley, J. F., 374
 Shapiro, P., 276

- Shapiro, P. R., 95, 105, 217,
224, 230, 232, 233, 236
Shapiro, S. L., 249, 440
Shapley, H., 241, 243
Sharov, A. S., 247, 256
Sharp, N. A., 165
Sharp, R., 403
Sharpless, S., 359, 360
Shaver, P. A., 355, 359, 360
Shaw, R., 44
Shaw, S. J., 245, 265, 268,
270, 271
Sheckman, S., 205
Shelley, E. G., 208
Shelus, P. J., 450
Sheridan, K. V., 114
Shields, G. A., 101
Shimizu, M., 461
Shine, R., 299
Shipley, E. N., 392, 397, 403
Shoening, W. E., 48, 49, 52,
53, 57-60
Shorthill, R. W., 445
Shortridge, K., 137, 152, 153,
155, 203
Shostak, G. S., 143, 149, 169
Shu, F. H., 237
Shull, J. M., 99, 216, 218, 219,
221, 226-28, 231, 376, 497
Shuryak, E. V., 428
Sibille, F., 12, 34, 356, 360, 378
Siemens, P., 423
Silk, J., 98, 99, 181, 217, 219,
222, 224, 227, 231, 238
Silk, J. K., 131
Siluk, R. S., 98, 219
Sim, M. E., 44, 56, 57, 60
Simon, M., 30, 351, 365, 366,
369, 376, 486, 488, 489,
499, 500, 504
Simon, T., 30, 33, 365, 366,
376, 388, 486, 488, 489
Sinclair, A. T., 471
Sinton, W. M., 469
Sion, E. M., 137
Sivan, J. P., 222
Skilling, J., 238
Skumanich, A., 516, 534, 537
Slaughter, C., 197
Slee, O. B., 114
Slipher, V. M., 140
Sloanaker, R. M., 358, 373
Slutz, S., 535
Smart, N. C., 164
Smart, W. M., 454
Smerd, S. F., 118
SMITH, A. G., 43-71; 44, 48,
49, 54-59, 61, 62, 65, 189,
504
Smith, B. A., 200, 392, 397,
403, 457, 458, 469
Smith, B. W., 180, 214, 223,
224, 236
Smith, D. W., 445
Smith, F. G., 68, 415
Smith, H., 484
Smith, H. E., 502, 503, 505
Smith, J. R., 32, 356
Smith, L. F., 83, 277
Smith, L. L., 319
Smith, M. A., 534
Smith, M. G., 245, 265, 268,
270, 271
Smith, R. A., 419, 421, 423,
429, 431
Smith, S., 135, 175, 403
Smith, S. A., 457, 458
Smith, W. H., 104, 105
Smyllie, D. E., 125
Snedden, C., 21, 23, 24, 29, 75,
77, 84, 105, 339, 341, 521,
522, 530, 531
Snell, R., 104
Snell, R. L., 18, 28, 34
Snijders, M. A., 505, 506
Snow, E. H., 208
Snow, T. P., 283-85, 294
SNOW, T. P. Jr., 213-40; 75,
77, 82, 84, 96, 98, 104,
105, 220, 221
Snyder, L. E., 370
Sobieski, S., 209
Sobolev, V. V., 286
Soderblom, L. A., 403
Sofia, S., 234
Soifer, B. T., 9, 11, 12, 14-16,
34, 35, 78-80, 101, 102,
356, 359, 360, 364, 369,
477, 486, 488-90, 505
Solinger, A., 231
Sollner, T. C. L. G., 375
Solomon, P. M., 282, 286, 348,
375
Sondaar, L. H., 116
Soneira, R., 166
Soni, A., 439
Soward, A. M., 302
Soyeur, M., 436
Spence, T. W., 400
Spencer, J. H., 356, 358-60,
370-74, 378
Spencer, R. E., 126
Spiegel, E. A., 543
Spinrad, H., 9, 11, 23, 53, 183,
258, 389, 478, 479, 482,
484, 486, 488
Spite, F., 340
Spite, M., 340
Spitzer, C. R., 403
Spitzer, L., 73-75, 81, 84, 85,
95, 98, 214, 217, 219, 227,
228, 235, 236, 249, 250,
269
Sreenivasan, S. R., 232, 276
Stachnik, R. V., 129, 131
Stalio, R., 294, 295
Stapinski, T. E., 205, 245
Stapp, J. L., 108
Starikova, G. A., 138
Starrfield, S., 35, 104, 377
Staubert, R., 416
Staude, M.-J., 367
Stebbins, J., 136
Steigman, G., 183, 233
Steigmann, G. A., 471
Stein, R. F., 226
Stein, W. A., 11, 12, 15, 16, 23,
33, 34, 74, 78, 79, 102,
358, 487, 493-99, 502-4,
506
Steinmetz, D. L., 22
Stencel, R. E., 303
Stephens, T. C., 91
Stern, R., 218, 224, 416
Steward, J. M., 14
Stiening, R. F., 486, 490,
495-97, 501
Stiglitz, R., 493
Stobie, R. S., 330
Stockman, H. S., 13, 36, 505
Stokes, G. M., 99, 219
Stokes, N. R., 463
Stone, R. P. S., 183
Stothers, R., 298
Straka, W. C., 137
Strecker, D. W., 11, 12, 19, 22,
24, 31, 32, 35, 80, 484,
492
Strelitskii, V. S., 375
Strittmatter, P. A., 31, 36, 137,
203, 208, 233, 502, 504
Strobell, M. E., 408
Strom, K. M., 30, 31, 68, 87,
151, 263, 348, 359, 478-81
Strom, S., 204
Strom, S. E., 30, 31, 68, 87,
151, 263, 348, 359, 478-81,
528, 531, 533
Strömberg, B., 85
Struck-Marcell, C., 481, 485,
489
Stump, C. J. Jr., 195
Subramanya, C. R., 126
Sullivan, W. T., 143, 353, 356,
370, 375
Summers, H. P., 223
Suntzeff, N., 319, 320, 328,
330, 332-35, 340
Sunyayev, R. A., 375, 440
Suomi, V. E., 388
Surdin, V. G., 249
Sutherland, P. G., 428, 429,
435, 436
Sutton, J. L., 395
Swandic, J. R., 90
Swank, J. H., 180
Swarup, G., 114, 116
Sweetnam, D., 390, 445
Sweigart, A. V., 319, 321, 326,
327, 332, 334, 336, 482
Swenson, G. W. Jr., 116
Swift, R., 201

564 AUTHOR INDEX

Swings, J. P., 13, 32, 81
 SWINGS, P., 1-7
 Sykes, M. J., 390
 Szkody, P., 14

T

Taam, R. E., 440
 Takatsuka, T., 421
 Takens, R. J., 416
 Tamagaki, R., 421
 Tamiya, K., 421
 Tammann, G. A., 140, 143, 167,
 170, 171, 173-75, 267, 496
 Tanaka, Y., 218, 221
 Tapia, S., 13, 502-4, 506
 Tarengi, M., 478, 484, 485
 Tatsumi, T., 421
 Taylor, B. J., 479, 486
 Taylor, G. E., 450, 452,
 454-58, 471
 Taylor, J. H., 415, 439, 440
 Telesco, C. M., 486, 488-92,
 495, 496
 Tenorio-Tagle, G., 378
 ter Haar, D., 370, 373
 Ter Louw, W. J., 417
 Terzan, A., 245
 Terzian, Y., 216, 345, 351
 Thaddeus, P., 356, 357, 364,
 375, 376
 Theys, J. C., 226
 Thomas, H. C., 327
 Thomas, J. A., 33
 Thomas, P., 408
 Thomas, R. N., 285, 293
 Thompson, A. R., 114-16, 120,
 121, 126
 Thompson, B. J., 129
 Thompson, G. I., 75, 81-84, 89
 Thompson, L. A., 166, 169,
 180, 263
 Thompson, R. I., 16, 20, 22,
 26-28, 31, 32, 36, 356,
 497, 535
 Thomsen, B. A., 469
 Thonnard, N., 143, 144
 Thorn, C. B., 425
 Thorne, K. S., 440
 Thornton, D. D., 116
 Thorpe, T. E., 391, 395, 398,
 404, 466
 Thronson, H., 101
 Thronson, H. A., 356, 359,
 360, 368, 369, 493, 507
 Thuan, T. X., 169, 263
 Thum, C., 83
 Tichenor, D., 122
 Tidman, D. A., 225
 Tielens, A. G. G. M., 365, 366
 Tift, W. G., 178, 253
 Tillman, J. E., 388, 389, 391,
 395, 397-400
 Timothy, A. F., 131
 Tinney, J. R., 51
 Tinsley, B. M., 150, 183, 255,
 325, 478, 479, 481-83, 485,
 489, 492
 Title, A. M., 195
 Tokunaga, A. T., 16, 356
 Tolbert, C. R., 215
 Toomre, A., 141, 165
 Toon, O. B., 403, 411
 Tornambe, A., 321
 Torres-Peimbert, S., 83, 101
 Toshinori, M., 35
 Toulmin, P., 410
 Townes, C. H., 489, 492
 Travis, L. D., 543
 Treffers, R. R., 12, 15, 22, 23,
 30, 102, 103, 365, 376
 Trefzger, Ch. F., 319, 320, 328,
 330, 332-35, 340
 Tremaine, S., 139, 471
 Tremaine, S. D., 249, 250, 269,
 327
 Trimble, V. I., 331, 334, 335
 Trout, D., 466
 Trubo, D., 197
 Trümper, J., 416, 433
 Truran, J. W., 183
 Tsakadze, J. S., 439
 Tsakadze, S. J., 439
 Tsuji, T., 17, 18, 21, 28, 514,
 519, 520, 523-27, 529, 533,
 535, 545
 Tsunemi, H., 218
 Tsuneto, T., 435, 436
 Tsuruta, S., 434, 437, 438
 Tubbs, D. L., 436, 440
 Tucker, K. D., 375
 Tucker, R., 393
 Tucker, W. H., 234, 283, 294
 Tull, R. G., 197, 208, 460,
 463
 Tully, R. B., 143, 148, 149,
 169-71, 267, 507
 Turner, B. E., 16, 356, 358-60,
 375, 489, 498
 Turner, E. L., 157-60, 166-68,
 170, 171, 179
 Turnrose, B. E., 176
 Tutukov, A. V., 13

U

Ugarte, P., 253
 Ulmschneider, P., 18, 302,
 531
 Ulrich, M.-H., 490, 492, 500,
 503-6
 Ulrich, R. K., 523, 524, 542-44
 Ulrych, T. J., 125
 Underwood, J. H., 302
 Upgren, A. R., 138
 Upson, W. L., 294
 Uyama, K., 486

V

Vaiana, G. S., 131, 301, 302
 Valtonen, M. J., 250
 van Albada, G. D., 143
 van Albada, T. S., 319
 van Altena, W. F., 68
 Van Blerkom, D., 285, 295
 van Breda, I. G., 87, 89, 92
 Van Camp, W., 390, 393, 394,
 401, 403, 404
 Van Citters, G. W., 207, 460,
 463
 van Citters, W., 22
 van de Hulst, H. C., 74, 105
 van de Hulst, J. M., 122
 van de Kamp, P., 137, 250
 van den Bergh, S., 176, 178,
 245, 249, 253-59, 261, 262,
 265, 267, 270
 van den Bout, P., 104, 218,
 460, 463
 Vanden Bout, P. A., 360, 375,
 379
 van den Heuvel, E. P. J., 416
 Van der Brugge, J. F., 116
 van der Hucht, K. A., 277,
 279, 297
 van der Hulst, J. M., 143
 van der Kruit, P. C., 141, 500
 Vandervoort, P. O., 345
 van Duinen, J. R., 75, 81
 Van Flandern, T. C., 455-58
 van Paradijs, J., 527
 van Paradijs, J. A., 416
 Van Riper, K. A., 426
 Vanselow, W., 63
 Van Speybroeck, L., 131
 van Woerden, H., 143
 Vapillon, L., 456, 463
 Varbese, S., 359
 Vardya, M. S., 521, 527, 538
 Veeder, G. J., 137
 Ventura, J., 433
 Vernazza, J. E., 532-34, 541
 Verschuur, G. L., 216
 Vescelus, F. E., 200
 Vetešník, M., 256, 257, 261
 Veverka, J., 390, 393, 403, 408,
 446, 449, 453, 455, 459-66,
 471, 472
 Vidal, N. V., 177
 Vidal-Madjar, A., 216, 294
 Vilas, F., 445
 Villa, G., 493
 Viner, M. R., 356
 Visser, J. J., 116
 Vittone, A., 14
 Vogel, S. N., 32
 Voges, W., 416
 Vogt, N., 349
 Vogt, S. S., 197, 208
 Vonder Haar, T. M., 388
 von Hoerner, S., 249

- Vorontsov-Velyaminov, B., 159
 Vrba, F. J., 32, 359, 478-81
- W
- Wacker, W., 367
 Wade, C. M., 116, 123
 Wakamatsu, K. I., 265, 266, 271
 Walcek, C., 398-400
 Walecka, J. D., 421, 428, 429
 Walker, A. B. C., 218
 Walker, G. A. H., 106, 190, 197
 Walker, M. F., 68, 253
 Walker, R. C., 356, 358-60, 371, 373, 374, 378
 Walker, R. D., 11, 15
 Walker, R. G., 353, 508
 Wall, E. J., 64
 Wallace, L., 461
 Wallerstein, G., 14, 99, 245, 311, 312, 319, 327
 Wallio, A., 390
 Walter, F., 218
 Wampler, E. J., 206, 323, 503
 Wang, E., 224
 Warburton, J. A., 114
 Ward, A. W., 408
 Ward, W. R., 411
 Warner, B., 460, 463
 Warner, J. W., 16, 31
 Warner, P. J., 116, 143
 Warren, W. H., 18
 Wasserman, L. H., 445, 446, 449, 452, 454, 455, 457-64, 466-71
 Watanabe, T., 545, 546
 Watson, W. D., 98, 233, 235
 Wattson, R. B., 201
 Weaver, H. F., 369
 Weaver, R., 214, 217, 230, 232, 233, 276
 Webster, B. L., 13, 14, 32
 Webster, P. J., 401
 Webster, W. J., 358, 359
 Webster Gottlieb, E., 375
 Weedman, D. W., 265, 493, 498, 499
 Wegner, G., 137
 Weiler, K. W., 360
 Weinberger, R., 356, 360, 365, 367
 Weise, W., 420, 430
 Weisheit, J. C., 236
 Weisskopf, V. F., 425
 Welch, W. J., 116, 374
 Weliachew, L., 143
 Welin, G., 14
 Welker, J., 390, 406
 Weller, W. G., 195
- Wellington, K. J., 116, 353, 356, 374
 Wellman, J., 391, 395, 398
 Wells, D. C., 460, 463, 478-81
 Welter, G. L., 105
 Welty, D. E., 104
 Wendker, H. J., 277, 356, 360, 363
 Wentzel, D. G., 238
 Wernecke, S. J., 125, 126
 Werner, M. W., 348, 351, 356, 358-60, 362-64, 369, 375, 376, 498, 502
 Wessel, W. R., 397
 Wesseliuss, P. R., 32, 81
 Wesson, P. S., 74
 West, R. M., 66, 243
 Westbrook, W. E., 351, 369, 375, 498, 502
 Westerhout, G., 138
 Westerlund, B. E., 234
 Westphal, J. A., 195, 200
 Weymann, R. J., 33, 298, 300, 305
 Wheeler, J. W., 428
 Whitcomb, S. E., 486, 490, 495-97, 501
 White, B., 396
 White, G. J., 360, 373
 White, N., 533
 White, N. M., 452, 454, 455, 457, 458, 471
 White, S. D. M., 165, 178
 Whitehurst, R. N., 143, 144, 147
 Whiteoak, J. B., 77
 Whitford, A. E., 113
 Whittet, D. C. B., 80, 87, 92, 371
 Wick, G. C., 422
 Wickes, W. C., 462
 Wickramasinghe, N. C., 35, 74, 79, 364
 Wiegandt, R., 249, 250
 Wielen, R., 137
 Wiemer, W., 75-77, 84
 Wijnbergen, J. J., 102
 Wild, J. P., 118
 Wilder, J., 53
 Wildey, R., 321
 Wildey, R. L., 392, 397, 403
 Wilhelms, D. E., 403
 Wilkerson, S., 36
 Wilking, B. A., 459
 Wilkinson, D. T., 200
 Wilkinson, P. N., 126, 489
 Williams, B. A., 152, 154
 Williams, D. R. W., 369
 Williams, J. T., 209
 Williams, P. M., 14
 Williams, R. E., 233
 Williams, T. B., 144, 153, 194
 Williamson, F. O., 218
 Williamson, R. M., 462
- Willis, A. J., 81
 Willner, S. P., 14-16, 34, 78, 101, 102, 356, 359, 360, 364, 365, 486, 488, 489, 502, 505
 Wills, B. J., 487, 503, 504
 Wills, D., 487, 503, 504
 Wilson, C. P., 200
 Wilson, D. M. A., 116
 Wilson, R., 75, 81-84, 505, 506
 Wilson, T. L., 345, 359, 360, 371, 376
 Wilson, W. J., 298, 358, 360, 375
 Wing, R. F., 9, 11, 12, 19, 24, 533
 Wink, J., 348, 356
 Wink, J. E., 100, 358, 359
 Winnberg, A., 221, 298, 353, 356, 359, 360, 363, 371, 372
 Winston, R., 486, 490, 495-97, 501
 Wiringa, R. B., 417
 Wirtanen, C. A., 85
 Withbroe, G. L., 97
 Witt, A. N., 88-91
 Witteborn, F. C., 11, 12, 19, 22, 24, 31, 32, 35
 Wittels, J. L., 126
 Wlrick, G., 68
 Woiceshyn, P. M., 390, 445
 Wojslaw, R. S., 19
 Wolf, B., 35
 Wolf, E., 117
 Wolf, M., 140
 Wolf, M. R., 390, 403, 404
 Wolf, R. A., 435-37
 Wolfe, D. A., 164
 Wolff, R. S., 416, 434
 Wollman, E. R., 22, 26, 28, 35
 Woltjer, L., 173, 246, 247, 251, 309
 Woodrow, J. E. J., 20, 532
 Woodward, P. R., 377
 Woolf, N. J., 29, 33, 36, 205, 297, 304, 358, 495, 496
 Woolley, R. v. d. R., 250, 251
 Woosley, S. E., 334, 440
 Wootten, H. A., 356
 Worden, S. P., 129, 132
 Wouterloot, J. G. A., 358
 Wright, A. E., 277, 284, 493
 Wright, C., 230
 Wright, E. L., 16, 358, 359, 365, 484, 486, 490, 495, 497, 500, 504
 Wright, M. C. H., 116, 143, 146, 374
 Wu, C.-C., 82
 Wynn-Williams, C. G., 15, 16, 74, 78, 346, 356-60, 362-64, 366, 367, 378, 496

566 AUTHOR INDEX

Y

Yahil, A., 135, 162, 173-75,
177, 183
Yamamoto, R., 401
Yamashita, K., 218, 221
Yang, C.-H., 420
Yang, K. S., 114
Yen, J. L., 371-73
Yentis, D. J., 218
Yeung, S., 411
Yildiz, A., 422
Yngvesson, K. S., 374
York, D. G., 75, 77, 81, 82, 84,
97-99, 104, 105, 216-22,
234, 294

Yorke, H. W., 378, 379
Yoss, K. M., 333
Young, A. T., 47, 53, 388, 392,
397, 403, 449, 459, 461
Young, E., 499
Young, P. J., 151-55, 178, 200,
270, 462
Yung, Y. L., 409, 411
Yungelson, L. R., 13

Z

Zaitseva, G. V., 245
Zamir, M., 277
Zasov, A. V., 498
Zeilik, M., 357, 359, 360

Zeippen, C. J., 96, 97
Zel'dovich, Ya. B., 229
Zerull, R., 88
Zinn, R., 245, 247, 309, 317,
328, 330, 337-39, 522
Zirin, H., 215, 299
Zombeck, M. V., 131
Zucchini, P., 194, 209
Zuckerman, B., 16, 348,
355-57, 359, 367, 375, 376,
489, 498
Zuiderwijk, E. J., 416
Zurek, R. W., 390, 396, 401,
402, 404-6, 459, 460
Zwicky, J., 135, 175, 177
Zytkow, A. N., 440

SUBJECT INDEX

A

- Ammonia
 - emission regions of
 - H II regions and, 376
- Andromeda galaxy
 - globular clusters in, 256-59
- Asteroids
 - occultation of, 458,466
- Astronomical photography
 - advances, 43-69
 - current hypersensitization, 52-65
 - ammonia, 53
 - autoradiography, 64, 65
 - chemical pre-exposure treatment, 52, 53
 - combined nitrogen-hydrogen treatment, 61, 62
 - environment during exposure, 65
 - evacuation, 54, 55
 - hydrogen treatment, 59-61
 - latensification, 63
 - moisture and oxygen
 - during exposure, 65
 - nitrogen baking, 56-59
 - nitrogen treatment, 55
 - oxygen interference, 54
 - pre-flash, 62, 63
 - push development and intensification, 63-65
 - silver nitrate bathing, 53
 - temperature during exposure, 65
 - vacuum-treatment, 54
 - water bathing, 53
- evaluating photographic response, 47-52
 - application classes, 51
 - characteristic curve, 47-49
 - density, 48
 - detective quantum efficiency, 51
 - dynamic range, 50
 - exposure, 48, 49
 - signal-to-noise, 49, 50
 - speed, 49
 - test light sources, 48
 - uniformity of response, 51, 52
- introduction, 43-47
 - chemical model of latent image formation, 44, 45

- development, 45
- evolution of photographic sensitivity, 46, 47
- "fog" grains in photographic process, 45
- formation of latent image, 44, 45
- gold sensitization, 45
- Gurney-Mott theory
 - explaining "reciprocity law", 45, 46
- latent image and reciprocity failure, 44
- low-intensity reciprocity failure, 46
- photographic emulsion and information storage, 43, 44
- reciprocity failure, 45, 46
- reduction sensitivity centers, 45
- reviews of emulsion function, 44
- silver halides in photography, 44, 45
- sulfur "ripened" in image formation, 45
- prospects, 66-69
 - applications, 66, 68
 - automatic direct star images, 68
 - computer analysis of plate content, 68
 - emulsion technology, 66
 - hypersensitization treatments summary of Kodak plates, 67
 - microphotometric stellar photometry on electrograms, 68
 - photographic measures, 68
 - photographic projects, 68

B

- Betelgeuse
 - highly magnified photograph of, 131
- Big Bang
 - cluster near pregalactic values, 325
- BL Lac-type objects
 - similarity to quasistellar objects, 505

C

- Capella
 - highly magnified photograph of, 131
- Carbon
 - isotopes of
 - star content of, 28
- Carbon monoxide
 - analysis of bands of, 26
 - prediction of emission cores and, 18
 - presence in cool IR stars, 11, 14
 - surface cooling in stars, 522
- Cloud complexes
 - observation of stars by, 15
- Cluster domain
 - chemical composition same, 309
- Clusters, globular
 - Milky Way mass and, 139
 - radial velocities of, 140
 - see also Globular clusters
- Comets
 - "grazing comets", 5
 - silicate features in dust of, 104
- Commission 29 (Stellar Spectra) of the International Astronomical Union, 4, 5
- Compact H II regions and OB star formation, 345-80
 - infrared observation, 364-69
 - amount of dust in H II region, 368
 - BN object discovery
 - identified, 365
 - chemical elements
 - identified, 365
 - cool circumstellar dust shells absorbing
 - near-infrared, 367
 - dense dust clouds around
 - H II regions, 368, 369
 - dust role, 366
 - far-infrared observations, 367-69
 - models for infrared
 - emission, 365
 - near-infrared map, 366
 - near-infrared observations, 364-67
 - objects of radio compact H II regions, 367
 - total far-infrared flux densities, 368

- total infrared radiation
 - from H II region, 368
 - what sources do we know? 364
- introduction, 345-49
- compact H II regions and
 - OB star formation, 346
 - compression factor of 10^{80} , 346
 - duration of formation of compact H II region, 348
 - H II earlier than OB, 346
 - map in ^{18}CO , 347
 - new class of galactic regions, 345
 - short history, 345, 346
- masers and compact H II regions, 369-76
 - general remarks, 369, 370
 - hydroxyl masers, 370-72
 - maser pump energy, 373
 - maser sources, 369
 - types of maser sources, 369, 370
 - water masers, 372-75
 - water maser sources, 373
 - water maser sources and star formation, 375
 - young maser sources, 370
- molecular emissions
 - associated with compact H II regions, 375, 376
 - blister model and, 376
 - molecular clouds larger than H II regions, 375
 - new star formation by dense regions, 376
 - OB associations formation, 375
 - temperature of clouds around H II regions, 376
 - total masses of clouds around H II regions, 376
- observations and
 - interpretations—general remarks, 349-53
 - bremssstrahlung, 351
 - continuum radiation, 350, 351
 - distances, 349
 - effects of significant optical depths, 351
 - infrared continuum, 350
 - plot of rms electron density vs linear size, 352
 - radio continuum, 350
 - radio continuum surveys, 353
 - resolution and sensitivity, 349, 350
 - sky surveys, 353
 - spectral lines, 352
- OB star formation 377-80
 - accretion flow fragments, 377
 - "cocoon star" formation, 378
 - evolutionary scheme, 379, 380
 - formation of OB star groups, 377
 - individual star formation, 377, 378
 - ionization front movement, 378
 - limitations of theory of individual star formation, 378, 379
 - nuclear fusion heat production and grain melting, 378
 - self-supporting mechanism of Elmegreen and Lada, 377
 - stellar core growing by accretion, 377
 - theory-observation confrontation, 379, 380
- radio observations, 353-364
 - Blaauw's subgroups, 363
 - blister models, 355, 362
 - classification of H II regions, 353-55
 - fusion of adjacent regions, 362, 363
 - group properties, 362, 364
 - interaction ionizing stars and molecular stars, 362
 - maps of NGC 7538 region, 363
 - new stars associated with OH masers, 363
 - sample of known ultracompact and compact H II regions, 355-61
- Computer image processing, 113-32
 - general digital image processing, 132
 - images handled in digital form, 132
 - implementation of Fourier synthesis, 118-24
 - area density compensation, 120, 121
 - cell summing, 123
 - Fourier transform relation, 118, 119
 - Gaussian convolution, 123, 124
 - interpolation, 122-24
 - principal response pattern, 120-22
 - principal transfer function, 120, 121
 - ringlobe phenomenon, 121, 122
 - sampling function, 120
 - sensitive loci for five-element east-west array, 121
- radio image formation, 114-18
 - astronomical interferogram, 115
 - automatic production of data, 114
 - closed servo loops for stabilizing, 114
 - complex visibility, 115
 - earth rotation aperture synthesis telescopes table, 116, 117
 - earth-rotation synthesis, 114
 - echo power collection, 114
 - fast interferometer incorporating minimum redundancy array, 115
 - Fresnel diffraction pattern of given pattern, 118, 119
 - image-forming radio-telescope, 115
 - image scanning by paraboloid, 114
 - internal monitoring of phase paths, 114
 - mathematics of aperture synthesis, 117
 - minimum redundancy principle, 115
 - sensitivity diagram of Fourier transform plane, 116
 - three-dimensional volume vector displacements, 117
 - two-dimensional array of antennae, 115
 - Wild's synthesis instrument, 118
 - Zernicke's complex degree of coherence, 115
- restoration, 124-27
 - CLEAN, 125

- map cleaning and
 - maximum entropy, 124-26
- restoration in the presence
 - of noise, 126, 127
- tapering, 124
- speckle interferometry, 127-30
- Airy disks, 128
- autocorrelation role, 129
- brief exposure gains, 128
- highly magnified
 - photographs of two stars, 130, 131
- modulation transfer
 - function, 129
- X-ray imaging, 131, 132
 - coded apertures, 131, 132
 - grazing optics, 131
 - pinhole camera use, 131
 - restoration and, 131
- Copernicus
 - stars of
 - winds of, 284

D

- Dark matter
 - around elliptical galaxies, 156
 - dark envelopes of galaxies, 165, 166
 - distribution of
 - light matter and, 162
 - evidence for strong, 182
 - missing matter of galaxies, 171
 - suggested forms and roles of, 183
- David Dunlap Observatory (DDO)
 - line-blocking methods and, 313
- Digital imaging techniques, 189-209
- digital image tubes, 207-9
 - detection of photoelectrons, 207
 - Digicon, 207, 208
 - Digicon for spectropolarimetry, 208
 - EBS-CCD's, 209
 - electron bombarded silicon
 - mode, 207
 - photon-counting array
 - photometer, 209
 - Reticon use as electron
 - counting device, 208
 - self-scanned Digicon, 208, 209
- hybrid systems, 201-7
 - book on image photon
 - counting system, 202

- centroiding and sampling
 - time control, 203
- electron gain of KPNO
 - system, 204
- intensifier-camera tube
 - systems, 202-5
- intensifier-image dissector
 - systems, 206, 207
- intensifier-silicon array
 - system, 205, 206
- Lick image dissector
 - scanner, 206
- limits of systems, 202
- Nocticon, 203
- single photoelectron
 - recording efficiency, 202
- University College Image
 - Photon Counting
 - System, 203
- introduction, 189, 190
 - design to increase accuracy
 - of observational data, 189
 - low light-level detectors, 190
 - recording images in digital
 - form, 190
 - symposia on, 190
 - transfer of flux of optical
 - output to digital
 - output, 189
- overview of types of digital
 - systems, 190, 191
 - Detective Quantum
 - Efficiency, 191
 - digital image tubes, 191
 - hybrid systems, 191
 - pulse counting of photoelectric
 - events, 191
 - secondary-electron-conduction
 - target tubes, 190
 - silicon arrays, 190, 191
 - television camera tubes, 190
 - types of detectors, 190
 - silicon arrays, 196-201
 - breadboard camera for
 - planetary observation, 200
 - CCD camera for
 - evaluation by
 - astronomers, 200
 - CCD's for imaging from
 - space, 200
 - "channel stops" and, 199
 - charge-coupled devices
 - (CCD's), 198-200
 - charge-injection devices
 - (CID's), 201
 - different types of, 196
 - history of, 199, 200
 - Reticons, 197

- scanning solar disk, 197
- self-scanned photodiode
 - arrays, 196-98
- television camera tubes, 190, 192-95
 - beam-landing character-
 - istic, 192, 193
 - camera tube output, 192
 - EBS/SIT camera tubes, 195
 - electron bombardment
 - silicon tubes, 195
 - photometric difficulties of, 192
 - SEC camera tubes, 194
 - silicon dioxide vidicon, 193
 - silicon target vidicon, 194, 195
 - "Vidicon" camera tubes, 193
 - video signal, 193
- Dust, interstellar
 - see Interstellar dust
- Dwarfs, white
 - masses of, 137

E

- Extragalactic sources infrared
 - emission, 477-508
- infrared emission from
 - elliptical galaxies, 477-83
 - CO index use, 482, 483
 - collapse enrichment
 - models, 480
 - color differences between
 - galaxies, 480, 481
 - color versus metallicity
 - relations in a galaxy, 480
 - composite nature of
 - spectral energy
 - distribution, 479
 - elliptical galaxies matter
 - form, 478
 - evolution of ellipticals, 481-83
 - first survey of wavelengths
 - of extragalactic
 - objects, 478-83
 - general properties, 477, 478
 - infrared excesses of
 - elliptical galaxies, 478
 - lifetime of galaxies, 482
 - metal content of ellipticals, 479
 - metal-rich models, 479-81
 - mid-infrared studies of
 - ellipticals, 483

- models with near-infrared data, 479
- near-infrared studies of late-type stars, 478-83
- small dispersion of near-infrared colors in ellipticals, 479
- surveys measuring narrow-band indices, 478
- wavelengths and spectral types, 478
- infrared emission from spiral and irregular galaxies, 483-93
- near-infrared observations of late-type stars, 484-91
- bright galaxies with silicon, 491
- examples, 485-90
- infrared spectra of extragalactic sources chart, 487
- K-L color, 484
- lack of dust, 486
- Magellanic irregulars, 485
- mapping of M82 at 10 μ m and 2 μ m, 488
- mass-to-luminosity ratios, 484
- M82 as example, 486-90
- NGC 253 as example, 490
- nucleus of the galaxy, 488
- population changes, 485
- rapid star formation, 489
- spiral galaxies classes, 485
- V-K color, 488
- other infrared studies, 507
- quasistellar objects, 501-7
 - Balmer lines, 505
 - BL Lac-type objects, similar, 505, 506
 - Compton collisions and, 503
 - examples, 501-3
 - general properties of, 503-7
 - highly redshifted objects and, 501
 - high visibility of, 503-5
 - nonthermal continuum of, 501
 - recombination theory, 502, 505
 - table of infrared observations, 504
- Seyfert galaxies, 493-501
 - correlation of infrared and radio fluxes of, 500
 - dust and emission, 495
 - examples, 495-99
 - general properties, 499-501
 - infrared properties survey of, 499, 500
- infrared variations of extragalactic sources:
 - plot, 494
- minimum time scale for thermal sources, 494, 495
- models of Seyfert galaxies, 496-98
- MRK 231 and MRK 509, 499
- nature of emissions of, 493
- NGC 1068, 495-98
- NGC 4151, 498, 499
- thermal radiation by dust, 500
- variability in emissions, 493-95
- Galaxies
 - atlases of interacting and peculiar galaxies, 159
 - globular clusters in
 - see Globular clusters in galaxies
 - Galaxies, binary
 - dynamics of, 165
 - mass-to-light ratio of, 156-66
 - Galaxies, dwarf
 - globular clusters in, 259-62
 - Galaxies, dwarf emission-line
 - infrared sources in, 493
 - Galaxies, dwarf spheroidal
 - Milky Way mass and, 139
 - Galaxies, early-type
 - binary mass determinations for, 163
 - mass-to-light ratios: table, 156
 - Galaxies, elliptical
 - dark matter around, 156
 - mass-to-light ratio of, 153
 - mid-infrared studies of, 483
 - models of, 152
 - motions of, 152
 - M 87
 - bright central spike of, 153
 - Galaxies, giant radioelliptical
 - infrared emission by, 492
 - Galaxies, infrared
 - infrared emissions of, 478-508
 - Galaxies, masses and
 - mass-to-light ratios, 135-83
 - coda, 182, 183
 - cold self-gravitating
 - asymmetric disks, 182
 - hydrogen in spiral envelopes, 182
 - invisible mass in universe, 182
 - warps driven by triaxial dark halo, 182
 - dynamics of small groups of galaxies, 166-75
- analysis of galaxy positions, 166
- compact groups, 173
- crossing time, 167, 168
- data contamination, 172
- group entering virialized regime, 168
- grouping of galaxies, 166
- group membership
 - definition, 169
- group velocity dispersions, 171
- listing of nearby
 - associations, 167
- Local Group movements, 173-75
- mass-to-light ratios, 168-72
- mass-to-light ratios of small groups: table, 170
- missing matter outside galaxies, 171
- model of universe, 172
- N-body simulations of galaxy clustering, 171, 172
- redshifts for sample of galaxies, 169
- uncertainties in analysis, 168, 169
- virial analysis of groups, 169
- galaxy masses from cluster membership, 175-83
- cluster velocity dispersions, 180
- computer N-body models of clusters, 178
- contamination assessment, 179, 180
- core fitting procedures, 180
- core-fitting procedure
 - difficulties, 178
- dynamical model for central mass-density, 178
- internal kinematics applied to, 175
- ionized gas correction, 181
- luminosity functions of clusters, 179
- mass study of core regions, 177
- other methods of mass determination, 177-79
- radial mass segregation, 181, 182
- uncertainties, 179
- unseen matter in clusters, 181
- virial mass exceeding expected masses, 175
- virial theorem and, 176, 177

- X-ray observations of
 - cultures, 180
- introduction, 135, 136
- "massive halo", 136
- mass-to-light ratio system, 136
- "missing mass" in clusters
 - of galaxies, 135
- substantial mass outside
 - visible galaxies, 135, 136
- mass-to-light ratio of binary
 - galaxies, 156-66
- associations in groups, 164
- binary mass determinations, 163
- binary mass-to-light ratios
 - in spiral-spiral pairs: table, 160
- dark matter in envelopes
 - of galaxies, 165
- derivation of masses and, 156
- E pairs, 164
- Kolmogorov-Smirnov test, 164
- spherical halos around
 - close binaries, 165
- tidal tails in intersecting galaxies, 166
- mass-to-light ratios of E and SO galaxies, 151-56
- dark matter around
 - elliptical galaxies, 156
- data conflict concerning, 153
- elliptical galaxies, 152, 153
- global virial theorem
 - application, 151, 152
- mass-to-light ratios of
 - early-type galaxies: table, 156
- M/L from nucleus
 - outward, 155
- possible black hole in M 87, 155
- SO galaxies, 152
- thermal bremsstrahlung, 155
- velocity dispersion
 - determination, 153
- X-ray emission by M 87, 155
- mass-to-light ratios of spiral galaxies, 140-51
- blue mass-to-light ratios
 - within Holmberg radius, 148
- compilation of rotation curves, 144
- dark material detected, 147
- galaxies with extended rotation curves list, 142, 143
- Holmberg radius of
 - galaxies, 141
- Larson-Tinsley model, 150
- mass-to-light ratios, 147-50
- mass-to-light ratios within
 - the Holmberg radius: table, 150
- model of galactic motion, 146, 147
- movements inside galaxies, 146
- observed rotation curves, 141-47
- Ostriker-Caldwell model of Milky Way, 150
- questioning of local
 - circular velocity, 146
- radio 21-cm observations, 143
- rotation curves study, 140
- rotation velocity
 - distribution, 141-43
- sidelobes of galaxies, 146
- Toomre disk models, 141
- varieties of rotation curves
 - of galaxies, 144, 145
- warps modeled, 146
- Milky Way, 137-40
 - error sources, 137
- faint-star luminosity
 - function, 137
- galactic acceleration
 - gradient, 138
- local mass density, 138
- Milky Way mass, 138-40
- nonluminous matter
 - beyond Sun's orbit, 140
- other estimates of mass of, 140
- solar neighborhood, a
 - benchmark in M/L , 137, 138
- white dwarf contribution, 137
- Galaxies, Seyfert
 - infrared emission by, 493-501
- Galaxies, SO
 - mass-to-light ratio of, 152
- Galaxies, spiral
 - hydrogen distribution in, 141
- Galaxies, spiral and irregular
 - infrared emission from, 483-95
- Galaxies, Virgo
 - globular clusters in, 262, 263
 - Globular clusters, giant
 - energy distribution of, 313
- Globular clusters in galaxies, 241-72
- Andromeda galaxy, 256-59
 - blue low-metallicity of, 258
 - chemical composition of, 257
 - cluster velocities of, 258
 - comparison with Galaxy, 257, 258
 - density profile for, 259
 - final list of, 256
 - fundamental data, 256, 257
 - "inner" vs "outer" color
 - measurements, 257, 258
 - intrinsic luminosity
 - distribution, 258
 - kinematics of, 258
 - M 31 and clusters, 256
 - photoelectric UBV
 - measurements, 257
 - photographic photometry, 257, 258
 - radial-velocity
 - measurements, 257
 - systematic properties, 257-59
 - total number of M 31
 - globular clusters, 259
- beyond the Local Group, 262-65
- color-magnitude plot of, 262
- globular clusters in Virgo galaxies, 262, 263
- multicolor photometry of, 263
- outside the Virgo system, 263-65
- spectrophotometry of, 263
- dwarf galaxies, 259-62
 - colors and metallicities of, 261
 - colors of, 260
 - Fornax system, 261
 - galactocentric distances
 - for, 259, 260
 - photometry of, 261
 - properties of: table, 260
- Galaxy, 243-51
 - apparent visual distances
 - for, 243-44
 - catalogue of raw data and
 - comment, 243-45
 - cluster identification, 243-45
 - distribution of physical
 - properties with
 - distance, 247-51
 - foreground reddening, 241-46
 - fundamental data, 243-47
 - galactocentric distance of, 244-46
 - globular-cluster luminosity
 - distribution, 249

- heavy-element abundance
 - as function of
 - distance, 247, 248
- heavy-element abundance estimates, 244-46
- integrated absolute magnitudes of, 243-45
- integrated apparent colors of clusters, 243-46
- internal dynamical relaxation driving clusters, 249
- kinematics and orbital characteristics, 249-51
- King structural parameters, 244-46
- mean physical properties of Galactic globular clusters: table, 249
- metallicity index vs galactocentric distance: plot, 248
- number of clusters per unit volume, 247
- orbit measurement models, 250
- overall rotation speed, 251
- point-mass model for Galaxy, 250
- population and space distribution, 247
- "Population III", 248
- protogalactic enrichment models, 247
- radial velocity of, 244-46
- "smoothing" effect, 250
- unfound clusters, 247
- velocity ellipsoid (orbit eccentricity distribution), 251
- general features of
 - globular-cluster systems, 265-72
 - density profiles, 270-72
 - globular cluster formation, 271
 - luminosity functions, 267-70
 - total populations and dimensions of parent galaxies, 265-67
- introduction, 241-43
 - largest system of globular clusters: figure, 242
- Magellanic clouds, 251-56
 - color-color diagrams for globular cluster systems, 254
 - color criterion, 253, 254
 - globular clusters in table, 252
 - globular vs open clusters, 253
 - integrated *UBV* colors as primary classification criterion, 253
 - mean luminosity of clusters, 255
 - old globular clusters, 255
 - populous blue clusters, 254, 255
 - red clusters, 253-55
 - "young globular clusters", 255
 - nonhomogeneity of metal abundances in, 309-41
- Gold
 - role in photographic process, 45
- H
 - Heavy elements
 - interstellar depletion of, 95-100
 - Helium
 - abundance in stars, 321, 324
 - ionization of photons and, 83
 - Hydrogen
 - convection zone of, 539
 - mean density of, 138
 - H II regions, compact
 - see Compact H II regions
- I
 - Infrared emission of extragalactic sources
 - see Extragalactic sources
 - infrared emission
 - see Extragalactic sources
 - Infrared spectroscopy of stars, 9-37
 - composition of stellar atmospheres, 20-29
 - atlas of solar photosphere and sunspot spectra, 21
 - atomic and molecular spectral features, 21-25
 - carbon stars, 27, 28
 - CO band analysis, 26
 - compounds studied, 24, 25
 - elemental abundance analysis from IR spectra, 25-28
 - isotopic ratios, 28, 29
 - M dwarfs, 26, 27
 - molecular bands in infrared spectra of cool stars, 22-24
 - molecular equilibrium abundances, 21
 - oxygen-rich giants, 26
 - temperature determination, 25
 - 3, 1- μ m C star band of spectra, 21
 - introduction, 9
 - IR sky surveys, 9
 - rapid technological expansion, 9
 - physics of stellar atmospheres, 17-20
 - departures from local thermodynamic equilibrium, 20
 - dynamics in stellar photospheres, 19
 - flux distribution modeling techniques, 18
 - high-resolution spectra of with vibration-rotation bands, 18
 - IR spectrum predicting stellar temperatures, 18
 - mass motions of stars, 19
 - model of scattering on dust grains, 17
 - model of spectrometric flux distribution, 17
 - over-ionization and, 20
 - stellar chromospheres, 18
 - stellar temperatures and temperature profiles, 17-19
 - spectral classification, 10-17
 - atlases of infrared stars, 10, 11
 - carbon monoxide in cool stars, 11
 - carbon-rich stars, 17
 - carbon star spectra, 12
 - classification of hot stars, 13
 - composite spectra, 13, 15
 - cool stars, 10-13
 - cyanide in cool stars, 13
 - dust signatures of circumstellar shells, 12
 - eruptive variable stars, 14
 - hot stars, 13
 - "ice" bands in cool stars, 12
 - "ice" to silicate absorption ratio, 16
 - IR spectral types, 11
 - mass loss of cool stars, 11
 - nature of composite stars, 13, 14
 - obscured stars, 15, 16
 - obscured stars in catalogues, 17

- photometric systems to measure CO and H_2O , 17
- shared IR spectral characteristics, 14
- silicates in cool stars, 12
- star populations, 16-17
- symbiotic stars, 13, 14
- stellar recycling, 29-36
 - cool stars, 33-35
 - "coronal" lines in spectrum of novae, 36
- dust particles in envelopes of cool stars, 33
- evolution of novae, 35
- grain composition, 36
- grain-sized candidate minerals, 36
- grain types in cool stars, 33
- grain types of stars, 29
- hot stars, 31-33
- modification of components of, 32
- novae, 35, 36
- silicate optical depths in cool stars, 34
- "veiling" of optical lines of cool stars, 34
- young stars, 30, 31
- Interobservatory Densitometer Calibration Plates
 - step wedges of, 48
- International Ultraviolet Explorer satellite
 - extinction curves from, 82
- Interstellar dust properties, 73-108
 - composition of grains, 106-8
 - coatings of grains, 107
 - diatomic oxides of various elements from grains, 107
 - graphite grains injected into medium, 106
 - lattice deficits in small crystal forming grains, 108
 - "mystery of missing oxygen", 107
 - nitrogen and oxygen abundances, 107
 - origin of the bump, 108
 - polarization of bump, 106
 - satellite measurements and OH radicals, 107
 - silicates injected by oxygen-rich M stars, 106
 - water as coating of grains, 107
- diffuse interstellar features, 104-6
- asymmetrical features of, 105
- compilation of diffuse feature measurements, 104, 105
- polarization characteristics, 106
- distribution of dust and dust-to-gas ratio, 85-87
- atomic hydrogen-to-color excess ratio, 87
- dust-total hydrogen ratio, 86, 87
- extinction maps and, 85
- gas column densities and interstellar reddening core correlation, 86
- heavy element depletion, 95-100
 - accretion and cloud parameters, 99, 100
- column densities of interstellar species, 95, 96
- cosmic abundances, 95
- depletion results evaluated, 96
- depletion vs condensation temperature in reddened stars, 97, 98
- detailed study of a few clouds, 96-98
- elements and cloud velocity, 98
- grain destruction and cloud velocity, 99
- limited number of elements toward many stars, 98
- oxygen depletion, 96
- Routy-Spitzer effect, 98
- Snow's hypothesis re depletion, 98
- solar abundances, 95
- interstellar extinction, 75-84
 - absorption of helium-ionizing photons, 83
 - average normalized extinction curves, 75-77, 81, 83, 84
 - Becklin-Neugebauer object and, 78
 - diffuse vs molecular clouds, 78
 - fine structure and, 77
 - helium-to-hydrogen ratios, 83
 - hydrogen Pasches lines and, 80
 - infrared and visual extinction, 26-81
- interstellar
 - polysaccharides, 79
- multicomponent grain models, 82
- regional differences in UV extinction, 82
- silicates and, 79, 80
- stars at Galactic center, 78, 79
- ultraviolet extinction, 81-83
- wavelength dependence of, 76
- interstellar polarization, 92-95
 - circular polarization, 94, 95
 - diffuse interstellar bands, 93
 - disordered silicates, 94
 - linear polarization, 92-94
 - interstellar extinction, 93
 - silicate grains and, 93, 94
 - wavelength dependence of polarization, 94
- introduction, 73-75
 - "coronal" phase of interstellar medium, 213
 - review of pertinent books and papers, 74
- light scattering by grains, 87-92
 - backscattering, 88
 - backscattering of dust phase, 90, 91
 - brightness across "Thumbprint Nebula", 91
 - calcium and observed values, 87, 88
 - diffuse Galactic light, 88-90
 - Heney-Greenstein phase function, 88
 - optically thick slab of dust, 91
 - plane-parallel model, 91
 - scattering from dust clouds, 90-92
 - sky brightness and, 89
 - stellar radiation field model, 90
 - surface brightness of dark nebulae and, 90
 - UV spectral regions and, 89
- thermal emission from grains, 100-4
 - carbon and silicon carbide emission, 103
 - carbon star emission, 103

- disordered silicates and, 101
 - emission from gaseous nebulae, 100-3
 - emission of dust from stars and novae, 102-4
 - galactic plane dust concentration, 102
 - heating by graphite grains, 100
 - heating by silicate grains, 100
 - hot circumstellar shell dust, 100
 - hydrogen-ionizing radiation from stars, 101
 - M stars inject silicate grains into interstellar medium, 102
 - rate of formation of planetary nebulae, 101
 - shape changes in entities, 102
 - silicate feature in comets, 104
 - spectroscopic features produced by interstellar dust, 103
 - Interstellar medium, violent, 213-38
 - introduction, 213-15
 - classical view of, 213
 - coronal gas inside supernovae, 214
 - interconnected "tunnel" system of coronal gas, 214
 - "interstellar bubble", 214
 - shocks in, 213, 214
 - state of interstellar medium, 214
 - "violent interstellar medium", 214
 - observational evidence, 215
 - Barnard's loop, 222
 - coronal gas, 217
 - distribution, morphology, and kinetics, 220-22
 - element depletion, 219, 220
 - expanding negative-velocity sheets of material, 221, 222
 - general picture of interstellar medium, 221
 - grains releasing calcium, 219
 - grains under duress, 218
 - Gum Nebulae and Vela supernova remnant, 222
 - high-velocity gas, 215, 216
 - high-velocity interstellar clouds, 216
 - hot coronal gas and diffuse X-ray background, 220
 - interstellar gas in cold clouds, 217
 - ionization equilibrium, 219
 - moderate-velocity cloud components, 219
 - nonstellar origin of gases, 217
 - origins of velocities, 215
 - physical characteristics of observed gas, 216-18
 - preponderance of velocity component negative at high latitudes, 215
 - specific velocity components, 216
 - spectra of hot stars, 220
 - sulfur in high-velocity clouds, 219
 - supernovae possible origin, 217
 - total kinetic energy, 222
 - ultraviolet studies, 216
 - warm and cool components of clouds, 220
 - zone following shock, 225, 226
 - theoretical interpretation, 222-38
 - blast wave causing supernova shell, 231
 - calculations of gas of cosmic abundance, 223
 - classical conductivity formula breaking down, 228
 - depletion of refractory elements, 227
 - destruction of grains, 225
 - determination of temperature of coronal gas, 224
 - energy sources, 230-35
 - evolution of bubble, 232-34
 - evolution of massive stars helped by stellar winds, 232
 - global models, 235-38
 - grains accelerated by betatron mechanism, 227, 228
 - grain destruction and a passing shock, 227
 - heating rate of coronal gas, 224
 - high Mach number and gas density, 225
 - high-velocity shocks, 225-28
 - inelastic collisions of thermal ions, 224
 - interstellar bubbles, 233, 235
 - ionization and emissivity of coronal gas, 223-25
 - ionization equilibria of optically thin plasma, 223
 - ions produced by downstream cooling region 227
 - model of stationary, plane-parallel interface, 228
 - physics of conductive interfaces, 228-30
 - radiative cooling as sink at interface, 229, 230
 - relative cooling zone structure, 226
 - repeated supernovae as sources of energy, 234, 235
 - saturation of thermal conduction, radiative losses and finite cloud radius, 229
 - stellar winds as sources of energy, 231-34
 - stellar wind velocity, 232
 - structure and evolution of "interstellar bubble", 232
 - supernovae as energy sources, 230, 231
 - supernovae shells, 232
 - total radiative cooling rate, 223, 224
 - upstream flow with high-velocity shocks, 225
 - UV absorption lines as tracers of expanding shell, 233
- L
- Local group
 - dynamics of, 139, 173-75
- M
- Magellanic clouds
 - see Globular clusters in galaxies, Magellanic clouds
 - Martian meteorology, 387-411
 - boundary layer, 394-97
 - "convective layer", 395
 - eddy viscosity coefficient, 396

- Ekman layer model, 396
- exchange between surface and atmosphere, 395
- extrapolation of terrestrial boundary with Mars, 396
- Lander 1 vs Lander 2 storms, 396, 397
- large-scale slopes, 397
- meridional wind and pressure: plot, 394
- turbulent transfer, 396
- Viking entry temperature profiles, 395
- zonally averaged cross section of temperature: plot, 394
- dust and atmospheric dynamics, 403-8
- condensation of H_2O and CO_2 , 407
- connections between dust storms, seasonal-sublimation cycle, and Martian orbital characteristics, 408
- diurnal and semidiurnal pressure amplitudes from Landers: plots, 405
- dust properties and distribution, 403
- dust storm genesis and decay, 406-8
- plots of two dust storms from Landers, 404, 405
- silicates chief component of dust, 403
- time evolution of planetwide dust storm, 404-6
- internal gravity waves, 397, 398
- internal gravity wave solitary waves, 398
- internal gravity wave trains, 398
- severe internal gravity waves, 398
- waves in Martian volcano, 398
- wind profile indicators, 398
- introduction, 387, 388
- atmosphere parameters, 388
- Viking mission, 387
- past climates, volatile reservoirs, and escape, 408-11
- average outgassing earlier, 410
- C, O , and N isotopes show formerly volatile receiver larger, 405
- convection and large scale dynamics, 409
- enrichment of ^{15}N , 410
- polar CO_2 ice, 410, 411
- role of CO_2 , 410
- warmer and wetter former climate, 408
- planetary waves, 398-403
- barotropic pressure troughs, 401
- breaking of tides, 402
- dynamical parameters for multilatitude winter plot, 400
- forced quasi-stationary waves, 401
- geostrophic effects of winds, 399
- main tidal components, 402
- meridional winds plotted, 399
- planetary thermal Rossby Number, 400
- regularity of, 400
- temperature (infrared) distribution from Viking orbiter, 401
- thermally generated diurnal tides, 401-3
- thermal tides, 401-3
- tides enhanced by heated dust, 402
- transient waves, 398
- pressure, temperature, and zonally averaged wind, 388-94
- atmospheric temperature profiles: plot, 392, 393
- CO_2 condensing on winter polar caps, 389, 390
- daily average pressure: plot, 405
- diurnal tides, 391
- duct heating effects, 393
- dust storms, 390
- general circulation model of winds, 393
- global dust storms, 393
- large-amplitude seasonal oscillation, 389
- pattern of meridional circulation at solstitial seasons, 393
- pressure time variations, 389, 390
- radiative-convective equilibrium models, 391
- solar radiation absorption by dust, 391
- temperature cross section: plot, 392
- temperature distribution, 391, 392
- thermal wind equation, 392, 393
- traveling storm systems, 390
- Viking entry temperature profiles: plot, 391
- zonal mean winds, 392-94
- small scale phenomena, 394-98
- Masses and mass-to-light ratio of galaxies
- see Galaxies, masses and mass-to-light ratio
- Metal nonhomogeneity of stars of globular clusters and satellite subsystems in Galaxy, 309-41
- chemical homogeneity of cluster stars vs halo stars, 340, 341
- "aging effect" and, 340
- barium abundances, 340
- halo field stars, 340
- halo giants vs cluster giants, 341
- metal-rich domain, 341
- chemical homogeneity of one cluster vs. another: the second parameter problem, 337-40
- anomalous metal-poor clusters, 338
- CNO group, 338-40
- halo clusters, 339
- light models, 340
- location in spheroidals of CNO, 338, 339
- O and CO strengths, 339
- rank-ordering of giants by CO strength, 339
- rank-ordering of metal abundances of clusters, 337
- s-Process, 340
- chemical inhomogeneity in stars in globular clusters, 325-37
- abundance problems of isolated clusters, 325
- calcium abundance variation, 330
- carbon converted to nitrogen, 332, 333
- carbon handling in CN stars, 332
- CH processing, 333
- CH stars, 327, 328
- CN variations, 328, 329
- CNO group in evolution, 326

- competition between
 - primordial fluctuations vs mixing with outside material, 336
- contamination
 - inhomogeneously by external media, 334
- CO variations, 329
- double shell-source (DSS) evolution, 326
- evidence for mixing, 331-334
- evidence for primordial variations, 334-37
- explosive nucleosynthesis in metal-poor stars, 336
- Fe peak and light metals between CNO group and Fe, 327
- Fe-peak variations, 329, 330
- fluctuations in dwarf spheroidal systems, 337
- helium in evolution, 326
- hydrogen-burning shells, 332, 333
- interpretation: mixing or primordial abundance variations, 331-37
- iron enrichment and "supernovae", 335
- light metals between CNO and Fe, 331
- luminosity for carbon depletion, 333, 334
- meridional circulation in stars, 332
- metal-poor cluster stars, 332
- mixing and classical evolutionary theory, 326
- nitrogen abundance unchanged in evolution, 328
- nucleosynthetic history of light metals, 331
- observational results re identity of clusters, 327
- overabundance of N and C, 332
- "primordial" and "mixing" indicators, 336
- radial color gradient, 336
- slow neutron flux, 327
- s-process elements, 331
- supernovae as
 - contaminants, 334
- Sweigart-Mengel theory, 333
- total cluster mass, 335
- variations in CN and NH in normal cluster stars, 328
- helium abundance
 - determinations, 324, 325
 - cosmological constraints, 325
 - evolutionary considerations, 324
 - He/H ratio, 324
 - pulsation theory, 324
- metal abundance
 - determinations: classical methods, 311-24
 - age range, 321
 - blue-sensitive plates
 - depending on (FeH), 323
 - color-color diagrams, 313
 - color-color plots for metal content: plots, 316
 - core rotation, 322
 - Dickens type: second parameter problem, 320
 - energy distribution for typical globular cluster giant, 313
 - giants: DDO system, Washington system, methods based on IR colors, 312
 - Giants: Searle-Zinn method, 313
 - Hartwick's, 320
 - He abundance range, 321
 - integrated cluster light yielding spectral indices: plot, 323
 - line-blocking methods, 312-18
 - low-resolution spectroscopy, 323
 - metal-abundance
 - determinations: secondary indicators, 319-22
 - metal abundances (FeH) for galactic globular clusters: table, 314, 315
 - metal abundances from integrated spectra and photometric indices, 322-24
 - metallicity range in globular cluster stars, 318
 - model atmosphere calculation of K giants, 323
 - other direct methods:
 - deltas measurement for RR Lyraes, 318, 319
- photometric color indices, 323, 324
- recently improved techniques, 311
- reddening-dependent quantities, 319, 320
- sample energy distribution of globular cluster:
 - plot, 317
- secondary abundance indicators: plot, 320
- subdwarfs CBV photometry, 312
- theoretical scanner fluxes of different metals, 311
- UV-excesses in cluster giants, 312
- "Washington System", 313
- Whitford reddening law, 317
- Milky Way
 - mass and mass-to-light ratio, 137-40
- Model atmospheres for intermediate and late-type stars, 513-46
- convection in stellar atmospheres, 537-45
- effects of mixing length convection on spectrum, 540
- effects on colors of cooler stars, 540
- effects on solar continuum, 541
- effects on spectrum of hotter stars, 540, 541
- hydrogen convection zone 539
- local mixing length theories, 538-45
- metallicity dependence, 540
- nonlocal mixing length theories, 542, 543
- non-mixing length convection, 543-45
- nonsolar models, 544, 545
- solar models, 544
- structural changes
 - produced by local mixing length convection, 539, 540
- temperature and gravity dependence, 539, 540
- two-stream convection theories, 543, 544
- departures from local thermodynamic equilibrium (LTE), 531-37
- departures from LTE in the atomic lines, 533-35

departures from LTE in the continua, 531-37
 departures from LTE in the molecular equilibria, 535
 departures from LTE in the molecular line spectrum, 535-37
 H and metal bond-free continua, 533
 H formation, 531, 532
 metal ionization equilibria, 532, 533
 model structure and departures from LTE, 534, 535
 extended atmospheres, 545, 546
 models of such atmospheres, 545, 546
 line blanketing, 515-31
 (A/H) and gas pressure, 521
 "backwarming", 516-18, 521, 524
 blanketing effects of stellar velocity fields, 525, 526
 carbon vs nitrogen in, 524
 CNO variables and intermediate-type atmospheres, 521
 CNO variations and intermediate-type atmospheres, 521
 CNO variations and late-type atmospheres, 522
 deeper continuum-forming layers, 516
 economic factor re model building, 526
 effects of changing $^{12}\text{C}/^{13}\text{C}$ ratio, 524, 525
 failure of the ODF approximation, 528, 529
 heating in superficial layers, 516
 H_2O role in, 519
 influence of (A/H) on atmospheric structure, 520
 intermediate-type atmospheres, 529
 line opacities, 516
 microturbulence effects, 525
 multiple pickets based on opacity distribution functions, 528
 opacity sampling, 530, 531
 optical depth scales, 515

physics of line blanketing, 515-19
 quantitative examples of line-blanketing effects, 519-26
 radiative equilibrium, 518, 519
 straight and harmonic mean opacities, 527, 528
 "super-metal rich" stars, 521
 "surface cooling", 516-19, 522
 surface heating, 519
 surface layers behavior in, 516, 518
 techniques for computing blanketed models, 526-31
 TiO role in, 519

M 31
 Andromeda galaxy and, 256
 mass, velocities and luminosity of, 174

N

Nebulae, gaseous emission from, 100-3
 Nebulae, planetary rate of formation of, 101
 silicates, graphite and amorphous carbon silicates in origin of, 102
 Nebulae, spiral rotation of, 140
 Neutron star physics see Physics of neutron stars
 Novae theoretical models for, 104

O

OB star formation see Compact H II regions and OB star formation
 Oxygen isotopes of star content of, 28, 29

P

Palomar Sky Survey photographic storage of data, 44
 Photography, astronomical see Astronomical photography
 Physics of neutron stars, 415-40
 equation of state: recent developments, 417-29

abnormal state in pure neutron matter, 422
 anti-quarks, 424
 baryon density in early universe, 423
 basic quark model, 424
 Brueckner-Bethe-Goldstone "nuclear matter theory", 417
 Brueckner theory and, 419
 calculation methods, 417, 418
 calculations for symmetric nuclear matter, 419
 calculations of abnormal matter, 423
 cohesive energy magnitude, 429
 "dispersion correction", 418
 effect of prior condensation of equation of state, 420, 421
 energy of quark matter calculated, 425
 field theoretic models at high density matter and the abnormal state, 421-23
 finite temperature equations of state, 426-28
 Ginzburg-Landau approach, 420
 intermediate states in nucleon-nucleon scattering, 417
 liquid crystal from solidifying matter, 421
 liquid regime, 417-20
 matter in high magnetic fields, 428, 429
 mean field theory model modification, 422
 merging of nucleons under pressure to liquid quark matter, 421
 MIT bag model, 425
 model calculations, 423
 model describing high-density matter, 421
 neutron liquid as superfluid, 419
 neutron matter equation of state, 421
 neutron star surfaces, 428
 nucleon-nucleon interaction, 418
 Pauli exclusion principle, 428
 pion condensation, 420, 421

- pion condensation tending to solidification, 420
- pion-condensed state may cause isospin, 420
- pressure in final stage of stellar collapse, 426
- quark-gluon theory, 424
- quark matter, 423-26
- quarks in neutron matter, 424
- Reid calculations, 419
- sigma-model, 423
- spectra of atoms in strong fields, 429
- stiffening of neutron stars, 419
- temperature dependences of nucleon-nucleon interaction neglected, 427
- two-nucleon scattering problem, 418
- Walecka's model, 422
- introduction, 415-17
 - formation of neutron stars in supernovae, 415, 416
 - general structure of neutron stars, 416
 - moments of inertia of neutron stars, 416
 - pulsars and neutron stars, 415
 - surface luminosity of neutron stars, 416
 - surface magnetic fields of neutron stars, 416
- neutron star models, 429-32
 - gravitational mass for various equations of states: plots, 429, 430
 - gravitational mass plotted against radius for equations of state, 430, 431
 - maximum mass equation, 432
- Pandharipande-Smith mean field theory calculation, 429
- Tolman-Oppenheimer-Volkoff equation, 429
- nonequilibrium processes, 432-39
 - bremsstrahlung cooling, 435, 436
 - cooling after by photon emission, 434, 435
 - cooling by neutrino emission, 434
 - cooling of Crab pulsar, 434
 - cooling of neutron stars, 434-39
 - cooling processes cooling interior, 437
 - cooling with superfluid nucleons, 435, 436
 - dynamical effects, 438, 439
 - internal temperatures of neutron stars, 434
 - large-scale magnetic fields in crust, 433
 - magnetohydrodynamic behavior, 434
 - neutron stars interiors approximately isothermal, 437, 438
 - neutron star surfaces, 433
 - pion condensation and cooling, 437
 - proton superconductivity, 434
 - schematic neutron stars cooling of interior by four processes: plot, 438
 - transport properties and hydrodynamics, 433
- Planets
 - occultation by, 456, 458
- Planets, ringed
 - occultation of planet by ring, 446, 447
- Polysaccharides
 - interstellar dust and, 79
- Preplanetary nebulae
 - symbiotic stars and, 14, 15
- R
- Rosemary Hill Observatory
 - sealed cassettes of, 65
- S
- Silicates
 - disordered spectral declines and, 101
 - interstellar dust and, 79, 80, 94
 - presences in cool IR stars, 12
- Silver
 - changes in photographic process, 44, 45
- Silver nitrate
 - photographic plates hypersensitization of, 53
- Spectroscopy
 - see Infrared spectroscopy of stars
- Stars
 - atmospheres of composition of, 20-29
 - carbon stars, 27, 28
 - cool stars, 33-35
 - formation of dark material and, 376
 - OB star formation, 327-80
 - hot stars spectra, 31-33
 - infrared spectroscopy of see Infrared spectroscopy of
 - mass motions of, 19
 - motions of rotation curve of, 140
 - oxygen-rich giants, 26
 - supergiants overall flux distribution of, 34
 - Stars, carbon organic constituents of, 523, 524
 - Stars, dwarf subdwarfs metallicity of, 312
 - Stars, early-type stellar winds and, 283-95
 - Stars, evolution of equation of state at subnuclear densities, 427 pressure in final stages of collapse of, 426 primary constituents in collapse, 426
 - Stars, infrared spectroscopy of see Infrared spectroscopy of stars
 - Stars, intermediate and late-type stars see Model atmospheres for intermediate and late-type stars
 - Stars, late-type near-infrared observations of, 484-90
 - Stars, neutron maximum possible mass of, 430 physics of see Physics of neutron stars
 - Stars, red giant chemical element abundance in, 317
 - Stars, RR-Lynae delta S-measurements for, 318
 - Stars, super-metal-rich models of, 52
 - Stellar occultation studies in solar system, 446-72
 - atmospheres, 458-66 central flash, 466 composition, 463, 464 extinction, 465, 466 individual planets reports, 462 scale heights and temperatures, 458-63

- temperature of Martian atmosphere, 460
- temperature profiles, 459, 460
- tides in, 459
- turbulence model, 459
- introduction, 445, 446
- definition of immersion, 445
- definition of occultation, 445, 446
- physical processes involved in occultation, 446-50
- "central flash", 448
- extinction by planetary atmosphere, 448
- occultation spikes (records reproduced), 449
- occultation without atmospheres, 450
- stellar occultation geometry and optics: plot, 448
- prediction and observational techniques, 450-53
- complete set of observations of an occultation, 452
- path of shadow of occulting body, 450, 451
- photometry of occultations, 452, 453
- probable error size, 452
- searching for ephemerides, 450
- signal-to-noise ratio, 453
- two-dimensional intensity pattern, 452
- prospects for future work, 472
- list of actions expected, 472
- use of occultations, 472
- radii, 453-58
- apparent elliptical figure of Pallas, 454
- chord method, single or multiple, 455
- occultation radii for planets, 455, 456, 462
- stellar occultation of satellites and asteroids, 466
- rings, 466-471
- elliptical shape of rings, 469
- models for rings, 469, 470
- Poynting-Robertson effect, 470
- rings of Uranus, 466, 468-70
- stellar diameters obtained by occultations other than moon, 471
- stellar diameters, 471
- occultation and, 472
- occultation of bodies other than moon, 471
- Stellar winds, 275-306
- introduction, 275-80
- coronal models of stellar winds, 276, 277
- driving mechanism
- theories of stellar winds, 277
- early-type stars mass loss, 277
- Hertzsprung-Russell diagram for stars with mass loss rates known, 278
- high-velocity outflows from supergiants, 275
- hybrid theories of stellar winds, 277
- ionization stages and, 275
- late-type stars mass loss, 277, 279
- radiative models of stellar wind, 276
- rotational speeds, 275
- reviews of recent findings, 276
- stars having measured mass loss rates, 277-80
- stellar wind theories, 275-77
- two classes of stars based on mass loss, 279
- mass loss from evolved late-type stars, 296-306
- acceleration of local terminal drift speed, 305
- chromospheric emission, 299
- classes of coronae, 301, 302
- clean vs dirty grains, 298
- coronal winds of G and K stars, 300
- destruction of grains by sputtering, 306
- domains of mass loss in H-R diagram, 299, 300
- dust column density, 305
- dust-driven winds, 304-6
- grain condensation, 305
- grain-gas collisions, 304
- height at which grain effective temperature 1000 K, 298
- height of grain formation, 298
- infrared excesses, 297
- Kwok's theory of total opacity, 305
- maser emission, 298, 299
- mass loss domains: figure, 298
- mass loss domains in H-R diagram, 299, 300
- momentum equation for dusts, 305
- observational data on mass loss, 296-99
- optical spectra and, 296, 297
- pressure at top of chromospheres, 303
- scenario of Mullan, 303, 304
- silicate bump, 297
- Supersonic Transition Locus, 302, 303
- supersonic winds, 302
- visible companions, 297
- processing of stellar components by, 32
- stellar wind equations, 280-83
- approximation used in stellar wind theories, 281
- coronal wind models, 283
- hybrid models derivation, 283
- purely radiatively driven wind theories, 281-83
- stellar winds of early-type stars, 283-95
- acceleration important to shell, 287, 288
- Auger mechanism high ion stages, 295
- depth scale independent of line opacity, 288
- empirical models, 285
- final kinetic energy luminosity, 286
- graphical solution of Castor, Abbott and Klein equation, 289-94
- hybrid model, 294, 295
- infrared continuum spectrum, 295
- infrared survey, 293
- ionization in wind, 294
- line driven wind theory, 286-89
- line profiles of early-type stars, 284
- mass loss rates from, 283, 284

- maximum loss rate, 286
 - multiple resonance shells
 - problem, 287
 - numerical solution, 291
 - observations, 283-85
 - Parker solar wind
 - equation, 289, 291, 292
 - radiation force multiplier (CAK), 288, 289
 - radiation transfer through shell, 286
 - radiatively driven wind theory, 285
 - relative abundance of ionization stages of elements, 285
 - rotation effects, 293
 - semiempirical models, 294, 295
 - shocks in flow, 293
 - Sobolev escape probability theory, 286
 - spectrum-velocity relations: figure, 284
 - temperature effects, 294, 295
 - "throat" of de Laval nozzle, 292
 - topology of solutions of motion for line driven winds: figure, 292
 - wind models, 285, 286
- Sulfur
 - role in photographic process, 44, 45
 - convection in, 544
 - streams in, 544
 - Sun
 - magnetic field mapped across disk and, 197
 - mass density of, 138
 - motions affecting Local Group, 173-75
 - orbital velocity of, 174
 - stars of solar continuum cooling of, 541
 - Supergiants
 - dust in, 298
 - mass loss rates of, 277, 279
 - Supernovae
 - interstellar medium and, 236, 237
 - shells of, 231, 232
 - Swings, P.
 - beginnings, 1-3
 - career as an astrophysicist, 1-7
 - Commission 29 (Stellar Spectra) of the International Astronomical Union, 4, 5
 - conclusion of sorts, 6, 7
 - names of collaborators, 6
 - identification in stellar spectra, 3
 - major research, 5, 6
 - cometary emission near gamma-4050, 6
 - cometary physics, 5
 - Fe III spectra in novae, 3
 - first forbidden line in comets, 6
 - intense cometary emission in the neighborhood of lambda 4050, 6
 - phenomena of twilight and aurorae, 556
 - Swings bands, 6
 - "Swings mechanism" in the O-stars with emission lines, 6
 - unidentified emission lines in OF-stars, 3
 - university activities, 6
 - workers active in astrophysical problems, 5
- U
 - Universe
 - galaxy grouping in, 166
- V
 - Vega
 - highly magnified photograph of, 131

